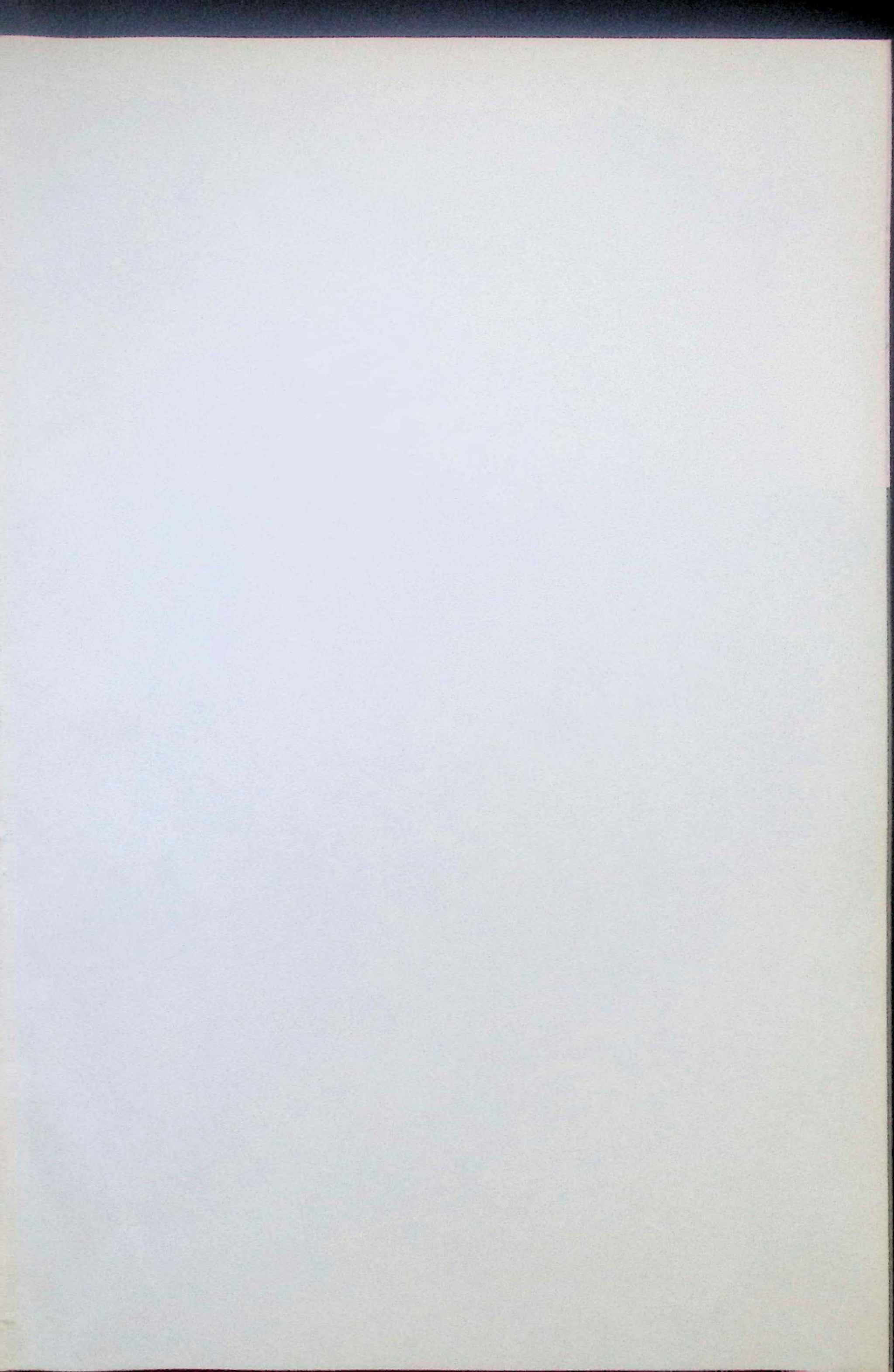


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IV

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CONTRIBUTIONS TO THE FLORA OF SOUTHWESTERN YUKON TERRITORY

BY A. E. PORSILD

é

RÉSUMÉ

Il s'agit surtout ici d'un rapport sur les plus importantes additions aux plantes vasculaires du sud-ouest du Yukon et à leur habitat, depuis la publication de *Flora of Alaska and Yukon* (1940-1950), d'Hultén, et de *Botany of Southeastern Yukon adjacent to Canol Road* (1951), par le soussigné. Il y a aussi des considérations sur la taxonomie, la répartition et l'écologie de certaines espèces limitées ou peu connues parmi les 267 taxa dont il est question.

Jusqu'en 1951, on ne savait que très peu de choses de la flore du sud-ouest du Yukon ou, en vérité, de la majeure partie du Yukon, sauf pour la région traversée par le chemin Canol, depuis Johnsons Crossing, sur la rivière Teslin, jusqu'à la frontière qui sépare le Yukon et le district de Mackenzie, région que l'auteur a visitée en 1944, et pour la voie de terre de White Pass à Dawson qu'un certain nombre de botanistes ont parcourue à la fin du siècle dernier et au début de celui-ci.

Entre 1944 et 1948, M. Hugh M. Raup, de l'Université Harvard, et ses associés ont fait de vastes et importantes collections de plantes le long de la route de l'Alaska, surtout dans le sud-ouest du Yukon. Malheureusement, du point de vue de la botanique, M. Raup n'a pas encore publié les résultats de ses expéditions.

Les plantes dont il est question dans le présent travail se trouvent dans l'*Herbier national du Canada*, et les plus importantes sont les collections faites à l'été de 1957 par M. H. A. Crum, du Musée national du Canada, et M. W. B. Schofield, alors qu'ils s'occupaient surtout d'une étude des bryophytes du sud-ouest du Yukon; M. Lloyd A. Spetzman, du *United States Geological Survey*, a fait une collection un peu moins vaste, mais tout aussi importante, en 1962.

En 1944, en 1951 et, de nouveau, en 1960, le soussigné a visité différentes régions du sud-ouest du Yukon, mais, faute de temps, il n'a pu faire de vastes collections de plantes, sauf dans le voisinage de Carcross.

The present paper is intended primarily as a report of significant additions or range extensions to the vascular flora of southwestern Yukon made since the appearance of Hultén's *Flora of Alaska and Yukon* (1940-1950) and the writer's *Botany of Southeastern Yukon* (1951), together with a discussion of the taxonomic status and the ecology of some critical or little known species among the 267 taxa dealt with.

The area included is essentially the intermontane dry plateau lying behind the Coast Ranges and extending from Teslin Lake westward to Kluane Lake (Phytogeographic Province number 2 as defined by the writer, l.c.) and the dry eastern ranges of the St. Elias Mountains. Although there is abundant evidence of glaciation followed by vast flooding of glacier-impounded lakes, the presence of numerous arctic and alpine species of Amphi-Beringian or Cordilleran affinity, besides several that are otherwise endemic to central Yukon and Alaska, suggests that even during the maximum advances of the ice, climatic conditions at least during later phases of the Pleistocene were sufficiently favourable for the survival of plants on unglaciated mountain refugia above the present 5,000- to 6,000-foot level. Even today arctic-alpine plants of disjunct range, besides arctic-alpine wide-ranging tundra species, are restricted largely to alpine tundra above the 5,000-foot level, whereas most of the species occupying the Dezadeash and Shakwak valley systems are wide-ranging members of the boreal forest or

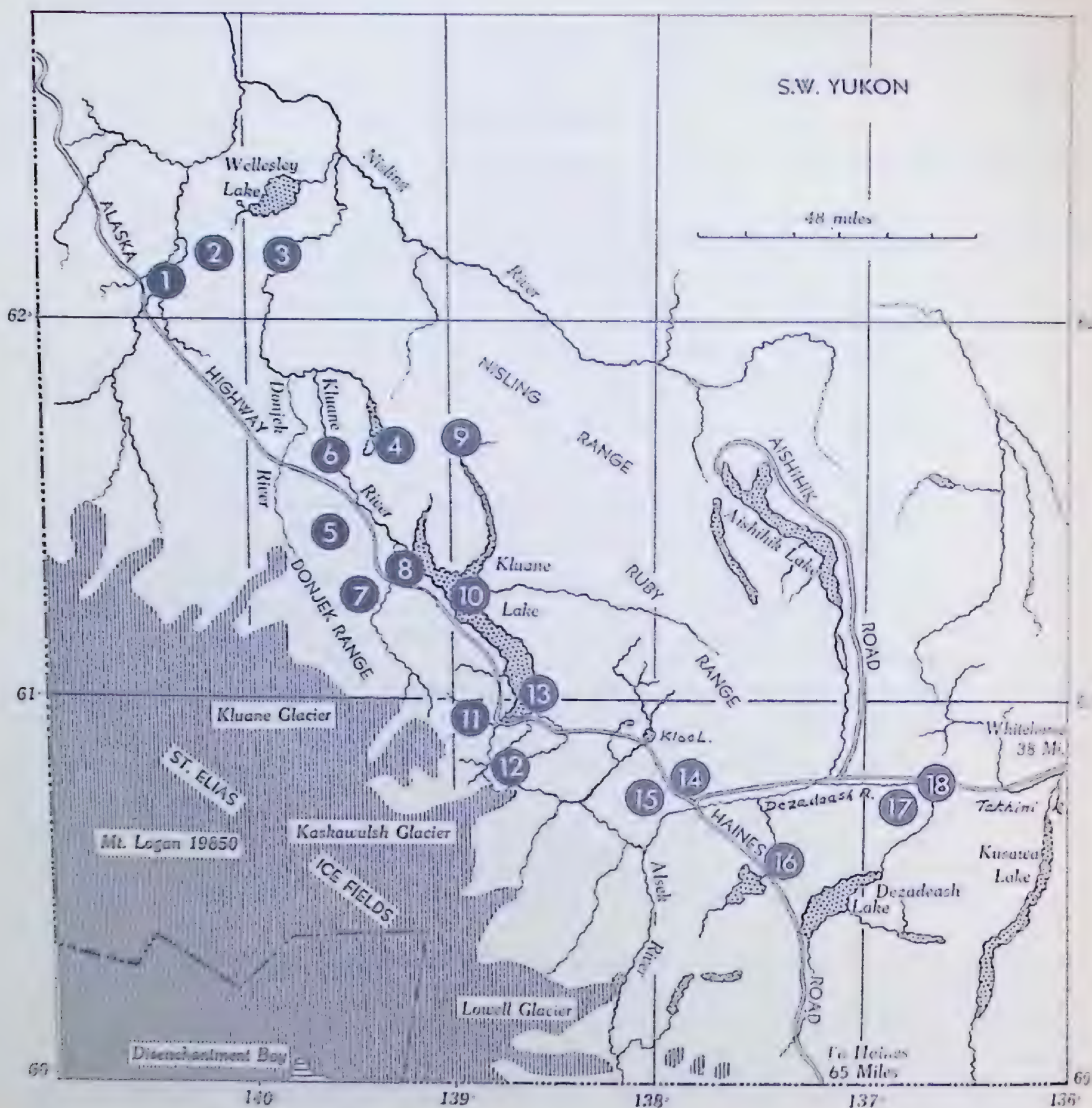


FIGURE 1—Map of southwestern Yukon. Numbers refer to principal places where plants were collected. (See p. 9.)

grassland-prairie flora. Among the latter, a number of xerophytic species, now occurring disjunct, suggest that in hypsithermal postglacial time the major valley systems may have enjoyed a climate somewhat warmer and drier than the present.

At the time of publication of the aforementioned floras, comparatively little was known of the botany of southwestern Yukon. Since then the results of more recent botanical exploration have become available, mainly from areas made accessible by the construction of the Alaska Highway and the Haines Road.

By far the most important explorations are those of Dr. Hugh M. Raup and associates, made during the summers of 1944 and 1948.¹ A complete set of the plants collected by them, including those from an earlier expedition led by Dr. Raup along the southern half of the Alaska Highway, is in the Gray Herbarium of Harvard University; a second set of their collections has recently been deposited in the National Herbarium of Canada. It is to be hoped that Dr. Raup's report on the botanical results of these expeditions will appear at an early date. William H. Drury, Jr., describing ecological habitats in a paper dealing with the avifauna of southwestern Yukon (Drury, 1953), recognized nine major vegetation types of which the primary and most conspicuous secondary plant species are listed. The writer (Porsild, loc. cit., p. 27-61) described the principal vegetation types of southeastern Yukon encountered by him along the Canol Road. According to W. B. Schofield (in litt.) the vegetation types in the Mackintosh area are very similar to those described by me from the Canol Road. In a paper dealing with the archaeology of the area (Johnson and Raup, 1964) Hugh M. Raup has dealt at some length with the vegetation of the southwestern Yukon area and its suggested history.

During the summer of 1957, Dr. Howard A. Crum of the National Museum of Canada, assisted by Dr. W. B. Schofield, made extensive collections of bryophytes in southwestern Yukon. Incidental to their main interest, they contributed a fine set of vascular plants from the area, totalling 1,013 numbers, several of which had not previously been reported from Yukon Territory, and a still larger group, which although known from other parts of Yukon, had not been reported from the southwestern part of the Territory. The bulk of their collection is from the valleys of Alsek and Dezadeash rivers, within a 10-mile radius of their main camp at Mackintosh on the Alaska Highway between Haines Junction and Bear Creek (Mile 1022). From Mackintosh, Crum and Schofield made a number of visits to nearby mountains to the west, chiefly to the upper slopes of Mt. Decoeli (7,630 ft.) and to those of the somewhat lower Mt. Archibald. Longer excursions were made to the mountains south of the delta of Slims River, near the south end of Kluane Lake, and along Haines Road between miles 75 and 100.

In late August 1951, accompanied by my brother, Mr. R. T. Porsild of Johnsons Crossing, Yukon, I spent a few days botanizing in the general vicinity of Carcross; again in June 1960, we collected a few plants along the Haines Road, between Haines Junction and the British Columbia boundary. Among our collections are several not previously known from Yukon Territory, besides some constituting significant extensions of the known ranges.

Between June 7 and July 9, 1962, Mr. Lloyd A. Spetzman, Military Geology Branch, United States Geological Survey, made general plant collections along the Alaska Highway between Snag, near the Alaska boundary, and Champagne, approximately 50 miles west of Whitehorse, while mapping the vegetation of 6,500 square miles for a future joint United States - Canadian winter army manoeuvre. This map report, now in preparation, will be Engineer Intelligence Study 328, entitled "Terrain Study of the Exercise Polar Pass Area, Yukon Territory, Canada," U.S. Corps of Engineers. The Spetzman collection, totalling 370-odd numbers, includes a large number of rare and interesting plants, mainly

¹Arnold Arboretum Expedition to the Alaska Highway, 1943 and 1944; Andover-Harvard Yukon Expedition, 1948 (Raup, 1944, 1945, and 1948).



A. Slims River delta, showing scanty vegetation of grasses on the mud flats near the north-west corner of the delta.
(Photo H. M. Raup, July 22, 1944.)



B. View from mountain summit north of Ptarmigan Heart Valley, in Ruby Range. Note rounded summits and gentle upper slopes.
(Photo K. A. Raup, July 16, 1948.)

from mountains adjacent to the Alaska Highway, several of which are either new to the flora of Yukon or have not previously been reported from the area. A complete set of the Spetzman plants has been deposited in the National Herbarium of Canada.

Finally, some small collections from the vicinity of Canyon, near the confluence of Aishihik and Dezadeash rivers, have been presented to the National Herbarium by the collector Mrs. J. Lammers of Whitehorse, Yukon.

During the summer of 1963, Messrs. P. M. Youngman and Gaston Tessier, zoologists in the National Museum of Canada, collected some plants near Carcross, Whitehorse, on Little Hyland River, near the Yukon-Mackenzie boundary, and in the Ogilvie Range 120 miles northeast of Dawson City. Again in 1964 Messrs. Youngman and Tessier made important collections of plants in the Ogilvie Range and in the botanically largely unexplored upper Porcupine River drainage. Although most of the Youngman and Tessier collections thus came from outside the area dealt with in the following catalogue, some additions to the known flora of Yukon and significant new stations of rare plants will be reported here together with phenological data from the Carcross area.

In the following catalogue are listed only the more noteworthy 'novelties' or range extensions contributed by the collections enumerated above. Wide-ranging species in the flora of Yukon previously reported from southwestern Yukon by Hultén (loc. cit.) or by the writer (loc. cit.) have not been included. For the sake of completeness, some of the more significant novelties among the 153 taxa listed by Doris Löve and N. J. Freedman (1956) from a collection made by the junior author in the Quill Creek area west of Burwash Landing near the north end of Kluane Lake are cited.

Practically nothing is known of the flora of the St. Elias Mountains. Their central parts are largely ice-covered, and the few peaks that stand above the ice are probably lacking vascular plants. The eastern ranges of the St. Elias Mountains lie in the rain shadow and, except for glacier tongues following river valleys, are not ice-covered. Anderson Bakewell, as a member of two American Geographical Society expeditions to the St. Elias Range under Walter A. Wood (1939 and 1941), collected some plants west of Kluane Lake near the expedition's base camp and along the pack trails to and from it. A list of the plants, determined by Hugh M. Raup, was published in *Rhodora* 45:305-16 (1943). It is probably far from complete. *Gentiana falcata*, reported as new to the flora of North America, is *G. tenella*.

Bostock (1952) and Kindle (1953) have outlined the glacial history of southwestern Yukon, based on a careful study of surficial deposits. According to them great ice masses, accumulated in the high central parts of the St. Elias Mountains, moved down slope in late Pleistocene time in a northeasterly and northern direction into the valleys of the Kaskawulsh, Dusty, and Alsek rivers to join the glaciers pushing north through the Klukshu and Takhini and the southern extension of the Shakwak valleys. These glaciers completely blocked the drainage to the Gulf of Alaska through Alsek River. At the time of the greatest glacial activity a great sheet of ice extended north toward the Nisling Range, covering all but the highest mountain massifs.

Toward the end of the Glacial epoch, when the main front of the ice had retreated to the eastern piedmont of the St. Elias Mountains, glacier tongues still occupied the main valleys causing the formation of a great ice-dammed



A. Floodplain of Slims River. View southward from Alaska Highway crossing. Soil is a fine-textured silt, with scanty vegetation of caespitose grasses.
(Photo H. M. Raup, September 4, 1948.)



B. Prairie opening at Mile 1019. This is the exact site of the present buildings of the Experimental Farm.
(Photo H. M. Raup, June 26, 1944.)

lake, which Kindle named 'Glacial Lake Champagne.' Great arms of this lake extended north into the valleys now occupied by the Mendenhall River and Taye Lake, as well as into the lower Aishihik Valley. To the south, even longer arms reached as far as Lake Dezadeash, a connecting channel extended east to the present Kusawa Lake, and a smaller arm filled the valley of the Kathleen River. Series of former shorelines of Glacial Lake Champagne are clearly visible along the valley and mountain slopes, extending in some places up to 500 feet above the present valley bottom. The present Kusawa, Dezadeash, Kathleen, and Taye lakes are remnants of former Lake Champagne.

In historic time Alsek River has been dammed at least twice by advances of Lowell Glacier. On the map accompanying his report, Kindle (*loc. cit.*) has traced the outline of a huge lake which formed following the damming of the Alsek.

The study by Raup and his associates of soil profiles in the western Dezadeash Valley and the Kluane Lake basin has added greatly to our understanding of the origin and development of the topography and soils of southwestern Yukon.

Botanical investigations in southwestern Yukon thus far have been confined mainly to the general vicinity of the Alaska Highway built during the years 1942-1943 from Dawson Creek, B.C., through northeastern British Columbia and southwestern Yukon to Alaska. From the Alaska boundary the highway follows the northwestern-southeastern-trending Shakwak Valley which separates the Kluane Plateau to the northeast from the largely glacier-covered St. Elias Mountains culminating in the 19,850 foot-high Mount Logan. From the south end of Kluane Lake the highway strikes out in an easterly direction following the Dezadeash Valley. At Haines Junction the Haines Road branches off to the south, eventually reaching tidewater at the head of Lynn Canal in the Gulf of Alaska. The broad floors of Shakwak and Dezadeash valleys, which have a general elevation of between 2,000 and 2,300 feet, are covered by reworked glacial till and gravel or by alluvial sand or silt. Where the surface has remained undisturbed by recent erosion it is generally mantled by deposits of loess and volcanic ash. In many places succession of former beach lines extends up the sides of the valleys.

Most of the area is in the rain shadow of the St. Elias Mountains or the Coast Ranges and has an annual precipitation of less than 12 inches, of which less than half occurs during the summer months. Strong winds are of frequent occurrence resulting in relatively high evapo-transpiration during summer months. In the vicinity of the St. Elias Mountains frequent foehn winds during the winter remove the scanty snow cover.

Although the average mean temperature for the warmest month (July) is 59° F, and the average number of days without killing frost is 21,¹ hardy field crops have been successfully grown at the Agricultural Experiment Station near Pine Creek (Alaska Highway, Mile 1019), and according to Kindle (*loc. cit.*) garden produce, including peas, beans, carrots, turnips, potatoes, and cabbage, has been grown for many years at the nearby trading post.

Some information on the progress of the seasons in the Yukon may be gleaned from geological reports. Some of these report snow conditions, break-up and freeze-up of rivers and lakes, and other seasonal events affecting travel

¹Kindly supplied by Meteorological Branch, Dept. of Transport.



A. Grassland on ancient beach in vicinity of Bear Creek, south of Mile 1021; alt. about 2,040 ft.
(Photo H. M. Raup, June 27, 1948.)



B. Grassland in Shawkak Valley about one mile east of Haines Junction; alt. about 1,970 ft.
(Photo H. M. Raup, June 26, 1944.)

and exploration. Few phenological data have been reported from any part of Yukon. Below are listed some early flowering and fruiting records extracted from a collection of plants made near Little Atlin Lake near Carcross at an approximate elevation of 2,400 feet by Gaston Tessier of the National Museum of Canada, on May 26 and 27, 1963: *Salix Bebbiana*, *S. Barclayi*, *Populus balsamifera*, *Pulsatilla Ludoviciana* (fruiting specimens), *Anemone parviflora*, *A. multifida*, *Corydalis aurea*, *Arabis Holboelli* var. *retrofracta*, *Draba oligosperma*, *Ribes oxyacanthoides*, *Saxifraga tricuspidata*, *Fragaria glauca*, *Potentilla nivea* ssp. *Hookeriana*, *Arctostaphylos Uva-Ursi*, *Androsace septentrionalis* (flowering and fruiting specimens), *Polemonium pulcherrimum*, *Mertensia paniculata*, *Viburnum edule*, and *Erigeron compositus*.

In the Dezadeash and southern extension of Shaskwak valleys the slopes are generally forest-covered to an elevation of about 4,000 feet above sea-level. White spruce (*Picea glauca* vars. *Porsildii* and *albertiana*) is the most important tree and on better sites attains a diameter of up to 24 inches. Stands of var. *Porsildii* make up most of the commercial timber of the region. Alpine fir (*Abies lasiocarpa*) and lodgepole pine (*Pinus contorta* var. *latifolia*) are confined to the eastern parts of the area where the fir is restricted to mesophytic subalpine sites, whereas the pine occupies dry, sandy or gravelly bottom lands. Trembling aspen (*Populus tremuloides*) and balsam poplar (*P. balsamifera*) are forest forming mainly on alluvial soils along valley bottoms. Paper birch (*Betula papyrifera* var. *neolaskana*) is rare and local, and black spruce (*Picea mariana*) is not encountered except in the northern part of Shaskwak valley. Larch (*Larix laricina*) is absent. The relative youthfulness of the lowland spruce forest is, at least in some places, due to recent changes in the water level of 'Recent Glacial Lake Alsek' and to the high incidence of forest fires indicated by charred logs and stumps and by charcoal horizons buried under successive alluvial deposits.

Key to the Principal Stations Where Plants Were Collected

See map: fig. 1.

1. Junction of White and Koidern rivers. Floodplain and wooded terraces. Elevation 2,200 ft.
2. North side of Koidern Mt. Tundra on glacial till. Elevation 4,300 ft.
3. Donjek floodplain south of Wellesley Lake. Wooded floodplain and grassy riverbanks. Elevation 2,000 ft.
4. Hill west of Dogpack Lake. Tundra on limestone and metamorphic rock. Elevation 5,300 ft.
5. Upper Quill Creek and tributary. Elevation between 4,000 and 5,000 ft.
6. West bank of Kluane River, 25 miles north of Burwash Landing. Tundra on granite cliff top. Elevation 4,800 ft.
7. Duke River near junction with Badlands Creek. Tundra on glacial till. Elevation 5,400 ft.
8. Burwash Landing. Sandy floodplain. Elevation 2,500 ft.
9. Head of Talbot Arm. Alpine tundra on schist. Elevation 5,000 ft.
10. Jacquot Island in Kluane Lake. Lakeshore and dunes. Elevation 2,500 ft.
11. Slims River near Sheep Creek. Alpine tundra on limestone. Elevation 4,800 ft. Vulcan Creek south of Slims River.
12. Slims River north of Kaskawulsh Glacier. Alpine tundra on metamorphic rock. Elevation 5,000 ft.
13. South end of Kluane Lake (Silver City). Gravel beach and bluffs. Elevation 2,600 ft.
14. Bear Creek (Mackintosh), Mile 1022 on Alaska Highway. Old lake terrace. Elevation 2,100 ft.
15. Mt. Archibald and Mt. Decoeli. Alpine tundra.
16. Kathleen Lake. Wooded moist gravel terrace. Elevation 2,400 ft.
17. Mt. Bratnober. Alpine tundra on metamorphic rock. Elevation 5,000 ft.
18. Champagne. Sandy bluffs, dunes, and swales. Elevation 2,000 ft.



A. Grassland in 'Duke Meadow' on abandoned Duke River floodplain west of Burwas Landing. View northward from the Alaska Highway.
(Photo H. M. Raup, August 24, 1948.)



B. Thin dry tundra of lichens, mosses, and low heaths on soils showing polygonal patterns. Summit of mountain in Ruby Range north of Ptarmigan Heart Valley.
(Photo H. M. Raup, July 16, 1948.)

ANNOTATED CATALOGUE OF SELECTED SPECIES

Where no collector's name is given, the collection was made by Drs. Crum and Schofield. Unless otherwise stated the collections cited are in the Herbarium of the National Museum of Canada at Ottawa.

For maps giving the North American distribution of truly arctic species discussed in the following pages, the reader is referred to the maps series in the writer's newly revised *Illustrated Flora of the Canadian Arctic Archipelago* (Porsild, 1964a). For most of the remainder, new maps are provided showing the Alaska to Greenland distribution of wide-ranging Amphi-Beringian or Amphi-Atlantic species or of plants endemic to Alaska and to northwestern Canada. No attempt has been made to map plant ranges beyond the United States - Canada border. The distribution shown in the maps is based on specimens in the National Herbarium of Canada, Ottawa, or on specimens seen and verified by the writer in other herbaria.

Cystopteris montana (Lam.) Bernh.

Mt. Archibald on sheltered willow-alder slope, No. 7809; McQuesten Area, mountain side east of Sunshine Creek, J. D. Campbell, No. 478; Haines Rd. just north of B.C. border, elev. 4,500 ft., A. E. & R. T. Porsild, No. 22323. In Yukon previously reported for the Dawson District and from the Pelly Mts. (Porsild, 1951). MAP 1.

Dryopteris austriaca (Jacq.) Woynar

Mt. Archibald, in damp alder thicket near stream, No. 7795. In Yukon otherwise known from two stations along the Canol Rd. (Porsild, 1951).

Woodsia alpina (Bolton) S. F. Gray

North side of Koidern Mt. in tundra on metamorphic rock, elev. 4,300 ft., young fronds on June 7, Spetzman, No. 1962-24. In Yukon reported from Pelly Range and Alaska boundary near Yukon R. (Porsild, 1951).

Woodsia ilvensis R. Br.

West side of Kluane R., tundra on granite, Spetzman, No. 1962-25. Richardson Mts., 13 miles northeast of Lapierre House, in rock crevices of quartzite slope, elev. 2,400 ft., where associated with *Selaginella sibirica*, July 28, 1964. Youngman and Tessier, No. 579. In Yukon otherwise known only from Mt. Sheldon on Canol Rd. (Porsild, 1951).

The spotty or disrupted range of *Woodsia ilvensis*, as well as of other calciphobous pteridophytes in NW. Mackenzie and Yukon districts, pretty well corresponds with the outcroppings of acid Precambrian rocks.

Botrychium lanceolatum (Gmel.) Angstr.

Mt. Archibald, near Bear Creek Summit (Mile 1028), elev. ca. 3,000 ft., No. 7900; damp slopes between Mt. Decoeli and unnamed mountain south of it, elev. 3,400 ft., No. 8142. In Yukon otherwise known from a single collection, on Mt. Sheldon on the Canol Rd. (Porsild, 1951). MAP 2.

Botrychium Lunaria (L.) Sw. var. *minganense* (Vict.) Dole

Vicinity of Mackintosh (Mile 1022), shaded area of rocky slope, No. 7989; among willows on dry, gravelly plain, No. 7430. In Yukon previously reported from two stations on the upper Canol Rd. (Porsild, 1951).

***Lycopodium sabinaefolium* Willd. var. *sitchense* (Rupr.) Fern.**

Vicinity of Mackintosh (Mile 1022), dampish slope of Mt. Decoeli. No. 8077; Haines Rd. just north of the B.C. border, alpine slope, elev. 4,500 ft., noted by Porsild, 1960. In the Northwest apparently a Pacific Coast race, previously known from Yukon, but reported from Haines Rd. just south of B.C. border (Porsild, 1951). MAP 3.

***Selaginella selaginoides* (L.) Link**

Although in Yukon reported only along the Canol Rd. (Porsild, 1951), this species apparently is common in SW. Yukon where it was collected along Haines Rd., No. 8304; Alaska Highway, Mile 1022, No. 7994. MAP 4.

***Selaginella sibirica* (Milde) Hieron.**

On granitic outcrops near Sulphur Lake (Mile 1038), No. 8037; dry rock crevices on slopes above Vulcan Creek, elev. 4,800 ft., No. 8198; granitic outcrops, west side Kluane R., elev. 4,800 ft., Spetzman, No. 1962-13; Richardson Mts., northeast of Lapierre House, on quartzite slope, elev. 2,400 ft., Youngman and Tessier, No. 581. In Yukon previously reported from a few stations near Dawson (Porsild, 1951). MAP 5.

***Sparganium hyperboreum* Laest.**

In shallow, alpine pool on slope above Vulcan Creek, south end of Kluane Lake, elev. 4,600 ft., No. 8204; vicinity of Mackintosh, in shallow pool, No. 8183. McQuesten Area, between Mary Creek and 40 Mile Creek, fruiting specimens on July 22, J. D. Campbell, No. 527. Lapierre House, in small pond near abandoned village, with immature fruits on Aug. 1, Youngman and Tessier, No. 603. MAP 6.

The range of *S. hyperboreum* is distinctly northern; it appears to be rare in Yukon where previously it has been reported only from Dawson (Porsild, 1951). It is rare or lacking also in the upper Mackenzie drainage, and to my knowledge has not been reported from Alberta or British Columbia, where I know it only from one station: Simpson Pass, elev. 7,000 ft., on Alberta - British Columbia boundary (Porsild & Breitung, No. 13870).

***Potamogeton Friesii* Rupr.**

Vicinity of Carcross, in creek draining Crag Lake; on August 24 only the fully developed wintering buds remained, the rest of the plant having already disintegrated, A. E. & R. T. Porsild, No. 18418. New to the flora of Yukon. MAP 7.

***Potamogeton pectinatus* L.**

Sulphur Lake near Mackintosh, submerged in shallow pool, No. 8041. In Yukon previously known only from stations along the southern part of Canol Rd. (Porsild, 1951). MAP 8.

***Potamogeton perfoliatus* L.**

Vicinity of Carcross, in creek draining Crag Lake, A. E. & R. T. Porsild, No. 18420. In Yukon otherwise known only from sloughs near Sheldon Lake on the Canol Rd. (Porsild, 1951).

***Potamogeton Richardsonii* (Benn.) Rydb.**

Sulphur Lake near Mackintosh, No. 8039. Probably common in suitable

places throughout Yukon, but, like the preceding, thus far reported only from the Canol Rd. (Porsild, 1951). MAP 9.

Alopecurus glaucus Less.; *A. occidentalis* Scribn. & Tweedy.

Damp margin of alpine streamlet above Vulcan Creek south of Kluane Lake, elev. 5,400 ft., No. 8201. McQuesten Area, upper South Rosebud Creek, in wet muskeg, flowering on June 16, J. D. Campbell, No. 84.

Colpodium Vahlianum (Liebm.) Nevski; *Puccinellia Vahlia* (Liebm.) Scribn. & Merr.

In wet, seepy places on slopes between Mt. Decoeli and unnamed mountain south of it, elev. 4,600–5,000 ft., Nos. 8106 and 8147. The specimens are high-grown in No. 8147 with culms up to 24 cm high. A high-arctic species of Amphiatlantic range, in North America mainly confined to the Arctic Archipelago although reported from alpine stations in the Mackenzie Mts. (Porsild, 1945). The present collection is the first from Yukon and extends the known range of *C. Vahlianum* by more than 300 miles to the west.

Danthonia intermedia Vasey

Alaska Highway near Mile 1036, No. 7746; mountain slopes above Vulcan Creek, south end of Kluane Lake, No. 8227. In Yukon previously reported from subalpine meadows along the Canol Rd. (Porsild, 1951). The present collection closes a gap between SE. Yukon and a single, unreported Alaska station, from near the head of Cook Inlet, Hatcher Pass between Palmer and Willow; Dutilly, Lepage, and O'Neill, No. 22012 (CAN). MAP 10.

Festuca brachyphylla Schultes

Vicinity of Mackintosh, near Mile 1022, on damp slopes and snow patch areas to elev. 4,600 ft., Nos. 7325, 7808, and 8126; Haines Rd. Mile 100, alpine terraces, No. 8290; Mt. Bratnober, in alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-40. The plants of the present series, as well as those reported from mountains along the Canol Rd. (Porsild, 1951), definitely should be referred to *F. brachyphylla* rather than to ssp. *saximontana* (see discussion in Porsild, loc. cit.).

Festuca baffinensis Polunin

North-facing shale scree of Mt. Archibald, No. 7857; damp alpine slopes between Mt. Decoeli and unnamed mountain to the south of it, No. 8114; mountains above Vulcan Creek near south end of Kluane Lake, in alpine tundra, elev. 5,000–6,000 ft., No. 8246, the last number with culms 30 cm high. An arctic species, in Yukon previously known from the Pelly Mts. and Kluane Lake (Porsild, 1955, and map fig. 17, where it was first reported from Alaska).

Festuca ovina L. ssp. *alaskana* Holmen f. *pallida* Holmen. Bot. Not. 117.2:115 (1964)

Richardson Mts. on shaly ridge 13 miles northeast of Lapierre House, elev. 3,000 ft., Youngman and Tessier, No. 583.

Densely tufted, with smooth culms about 20 cm high, twice as long as the fresh green, narrow and canaliculate leaves that are very scabrous along the margins. Panicle lax, almost spike-like, about 2 cm long, its 3 to 5 spikelets mostly 4- or 5-flowered; lemmas with a prominent somewhat bent awn; anthers 1.5 to 2.0 mm long.

A somewhat similar plant from the north slope of Endicott Mts., west of

the Alaska border: Old John Lake, 68° 08' N, Kjeld Holmen, No. 895 (CAN) differs from ours in having smooth leaves. It was named *F. ovina* L. by the collector who reported a chromosome count of $2n = 14$.

Festuca rubra L. s. str.

Apparently common in the vicinity of Mackintosh (Mile 1022) in open woods and bogs, Nos. 7499, 7531, 7534, and 7673; alpine shale slope of Mt. Archibald, No. 7865. Kluane Lake, Burwash Landing, Spetzman, Nos. 1962-37 and 38; Jacquot I., *idem*, No. 1962-39. In Yukon previously reported from river flats of the Pelly Mts. (Porsild, 1951). MAP 11.

Festuca rubra L. var. *arenaria* (Osborn) Fr.

Open spruce woods near Mackintosh, No. 7436; between Bear and Pine creeks, No. 7633. In the var. *arenaria* the lemmas are characteristically long-hirsute and the anthers commonly 2 mm long as against 3 mm in *F. rubra*.

Festuca vivipara (L.) Sm.

Alpine shale scree of Mt. Archibald, No. 7847; damp alpine slope above Vulcan Creek south of Kluane Lake, elev. 5,000 ft., No. 8233. First record for Yukon.

Festuca vivipara is caespitose and was formerly considered a mere viviparous form or variety of *F. ovina* or *F. brachyphylla*. Fernald (1926, p. 151) pointed out that in the latter species the lemmas are always aristate or even awned whereas in *F. vivipara* they are quite awnless, concluding that "the change from a fertile to a viviparous spikelet should not also alter the lemmas from aristate to muticous." Fernald's view that *F. vivipara* is a distinct species has been strengthened by Scholander (1933, p. 139 et seq., and 1934, p. 73) who noted that anthers, when present, are from 2.0 to 2.5 mm long and the glumes and lemmas hirsute, especially in the var. *hirsuta* (Lge.) Schol. (based on *F. ovina* var. *hirsuta* Lge., 1880, p. 179), and, finally, Gjaerevoll (1958, p. 36) has recorded that in *F. vivipara* "the upper half of the culm is strongly scabrous." The N. American range given by Fernald (*loc. cit.*) for *F. vivipara* was "W. Nfld. and Anticosti and Lake Mistassini, Que." Hultén considered it Amphi-Atlantic and in his map (1958, fig. 17) shows a total range extending from Novaya Zemlya, Spitsbergen, alpine parts of Scandinavia south to mountains of Scotland and Wales, Iceland, southern east and west Greenland (but for some unexplained reason excludes numerous stations reported by Scholander (*loc. cit.*) from Northeast Greenland between lat. 70° and 82° 29'), Labrador-Ungava, south to Newfoundland and the Gulf of St. Lawrence, and west to southern parts of Hudson Bay. The last statement is certainly erroneous and undoubtedly based on specimens of *F. prolifera* (see following). From beyond Hudson Bay Hultén knew only a single western station, on Seward Peninsula, Alaska (Porsild, 1939, p. 182). To bring this into his map (*loc. cit.*, fig. 17) he drew a thin line circumscribing a long corridor connecting W. Alaska to Hudson Bay. Although the viviparous *Festuca* shown by Hultén in the Ungava - Hudson Bay area is not *F. vivipara*, that species, unknown to Hultén, has now been collected in a number of widely disjunct stations in the Canadian Cordillera north through Yukon and mountains of Alaska to Bering Strait. *F. vivipara* thus is another bicentric plant in North America, having a small eastern population centring around the Gulf of St. Lawrence and Newfoundland, and a much larger western area separated by a gap of 2,000 miles.

In West Greenland no viviparous *Festuca* has been reported north of latitude 65°, nor has any, despite the very considerable amount of collection of recent years, been discovered in the Canadian Arctic Archipelago.¹

In boreal eastern N. America the area of *F. vivipara* is to some extent overlapped by that of another viviparous dwarf *Festuca* which, by Hultén (loc. cit.) and Polunin (1940), has been misidentified as *F. vivipara*. This is *F. prolifera* (Piper) Fernald which, as pointed out by Fernald (1933, p. 133), has awnless lemmas, prominently pilose in var. *lasiolepis* Fern., and when non-viviparous spikelets are present, has 1.5 to 2.0 mm long anthers; it differs further from *F. vivipara* by its stoloniferous or loosely caespitose habit and reddish-purplish basal sheaths, as in *F. rubra* to which it is undoubtedly related. To this may be added that in *F. prolifera* the culms are always smooth as are the narrow glumes. Fernald (loc. cit.) believed this a "clear-cut endemic species of Eastern North America" known to him from "the highest mountains of New Hampshire, Maine, Quebec and Newfoundland (as well as lower stations on the limestones of Gaspé, Anticosti and Newfoundland)." To this limited range may now be added a good many stations in Ungava – Labrador, north to Ft. Chimo, westward along the shores of Hudson Bay to the lower Thelon River in Mackenzie District.

In the northern parts of their Canadian ranges *F. vivipara* and *F. prolifera* may sometimes be separated with difficulty. Thus the plant reported as *F. vivipara* by Polunin (loc. cit.), from Cape Smith on the east shore of Hudson Bay (Polunin, No. 1308), is certainly *F. prolifera*, as one might indeed suspect from its obviously stoloniferous habit as indicated by Polunin's statement (loc. cit., p. 88) "spreading as a thin investment over sparsely vegetated sandy banks and sending up only occasional tall, light-coloured culms." MAP 12.

***Glyceria pulchella* (Nash) K. Schum.**

Damp lakeshores near Johnsons Crossing, Porsild, No. 18393. In Yukon previously collected a few times along the Yukon and its tributaries. MAP 13.

***Koeleria cristata* (L.) Pers.; *K. yukonensis* Hult.**

McQuesten Area, 4 miles east of Pelly Farm, in open poplar woods of high river benches, J. D. Campbell, No. 20. Bear Creek, sunny dry gravel-lime terrace. Spetzman, No. 1962-63. Little Atlin Lake, flowering May 27, 1963, G. Tessier (CAN). Also reported from Lewes R., Porsild (1951).

No *Koeleria* had been reported from Yukon or Alaska prior to 1942 when Hultén (1942) described two new species from Yukon, each based on a single and rather scrappy collection. In his key (loc. cit., p. 189) they are distinguished as follows:

Culm glabrous, finely scaberulous above, sheaths glabrous, lemmas glabrous, 5–7 mm long
K. yukonensis

Culm softly pubescent with soft long hairs above, sheaths pubescent, lemmas long-hairy, about 3.5 mm long
K. Cairnesiana

With the more abundant and better material now available it is evident that *K. yukonensis* cannot be separated from the polymorphous *K. cristata* (L.) Pers.

Koeleria Cairnesiana, still known only from the type collection which is in

¹Hultén (loc. cit.) wrongly quotes me as having stated that "all viviparous *Festuca* in the Canadian Arctic Archipelago belong to *F. baffinensis*."

the National Herbarium of Canada, consists of four detached culms lacking basal leaves. Although somewhat taller than *K. asiatica* Domin, it agrees perfectly with that species in the pubescence of the culm and in its floral parts. *K. asiatica* is now known from several stations on the north slope of Alaska; it would be surprising if its range does not extend east into northwestern Yukon. Unless new and better material turns up proving *K. Cairnesiana* truly distinct, the latter name seems best considered a synonym of *K. asiatica*.

Muhlenbergia Richardsonis (Trin.) Rydb.

Tagish, in low, wet prairie at Narrows, A. E. & R. T. Porsild, No. 18427. In Yukon otherwise known from a single station near Mile 988 on the Alaska Highway (Porsild, 1951). MAP 14.

Phippsia algida R. Br.

Alpine slopes near late snow patches along Haines Rd. Mile 100, elev. 5,300 ft., No. 8300. First record from Yukon. Circumpolar species which, outside the high Arctic, is known from a few widely disjunct alpine stations in Wyoming and Colorado, and also from the Alaska Range (Gjaerevoll, 1958).

Poa ampla Merrill

Vicinity of Mackintosh, Nos. 7475 and 7530. Both collections were made near the highway. In the area previously reported (Hultén, 1942), from Skagway, Alaska, and from Whitehorse and Hootalingua, in Yukon. The fact that *Poa ampla* in Yukon or Alaska has not been collected far from roads, railway embankments, or townsites suggests that it is not indigenous to the flora.

Poa Canbyi (Scribn.) Piper

Vicinity of Mackintosh, in open places near margins of alkaline meadows. Nos. 7434, 7528, 7687, 8171, and 8178. In Yukon previously reported from river flats and meadows of the interior. MAP 15.

Poa rupicola Nash

Dry alpine slope between Mt. Decoeli and unnamed mountain to the south, elev. 5,000 ft., No. 8127; Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-70. The specimens closely match *P. rupicola* from high mountains of the southern Canadian Rockies, including collections in the National Herbarium determined by A. S. Hitchcock. The collection is the first from Yukon, but specimens from central Alaska reported as *P. rupicola* by Anderson (1944), by Hultén (1950) without comment, were referred to *P. glauca*.

P. Williamsii Nash

Alpine slopes of Mt. Archibald, No. 7806; gravel slopes near the glacier between Mt. Decoeli and unnamed mountain to the south, No. 8125.

In Yukon previously known from the Pelly Mts. and from a single collection on Kluane Lake. In No. 8125, collected on August 2, the flowers are fully expanded. (For a discussion of *P. Williamsii* and *P. arctica* in Yukon, see Porsild, 1951.) MAP 16.

Poa sp.

The Crum and Schofield collection includes two numbers of a viviparous *Poa* from damp, gravelly tundra slopes of Mt. Decoeli, at elevations between 4,200 ft. and 5,000 ft. (Nos. 8050 and 8123). These plants are loosely tufted with

stout ascending shoots, the bases of which are covered by papery, purplish-white sheaths, somewhat in the manner of *P. alpina*, with a prominent ligule and flat blades, 3–4 mm broad and 3–5 cm long. The culms are smooth, 25–30 cm long bearing 2–3 short, flat blades. The panicle is strongly tinged with purple, 4–6 cm long, and the smooth branches are spreading, in 2's to 4's. In No. 8050 a few non-viviparous spikelets contain sterile florets in which the lemmas are feebly cob-webbed at the base and almost completely smooth on the back. A collection from Hope, Alaska, J. P. Anderson, No. 6630 (CAN), labelled *Poa alpina* L. var. *vivipara*, closely resembles No. 8050. To me the Crum and Schofield plants suggest a viviparous form of *P. Williamsii* rather than of *P. alpina*. The latter, although often viviparous in eastern Canada, is not known to me in that state in the West.

***Puccinellia deschampsoides* Th. Sør.**

On sand bar in Slims River, Kluane Lake, J. P. Anderson, Nos. 9523–4.

The specimens are taller and more robust, but otherwise closely match specimens from Gt. Bear Lake (Porsild, No. 5168) and from Liverpool Bay on the Arctic Coast near the mouth of Anderson R. (Porsild, No. 2826) both referred to this species by Sørensen (1953). The present record is the first from Yukon and constitutes a further western extension of the very spotty and disrupted range of the rare and little known taxon. MAP 17.

***Puccinellia interior* Th. Sør.**

Vicinity of Mackintosh, on recently disturbed soil in open spruce woods, No. 7635; wet turfy soil in open spruce woodland, No. 8172.

Following Sørensen (1953) the above numbers should be referred to *P. interior* as should an earlier Yukon collection from Whitehorse (M.P. & R. T. Porsild, No. 114) by me (Porsild, 1951) reported as *P. Nuttalliana*. MAP 18.

***Stipa columbiana* Macoun**

Sulphur Lake, Mile 1038, on prairie slope near granite outcrop, No. 8031. A Cordilleran grassland species in Yukon previously reported (Hultén, 1942) from near Whitehorse, but in Canada otherwise known only from subalpine prairies of southern Alberta and British Columbia. MAP 19.

***Carex atherodes* Spreng.**

Vicinity of Mackintosh, forming large colonies in damp alkaline meadows in open spruce woodland, Nos. 7740 and 8170. In Yukon reported earlier from subalpine meadows along Canol Rd. and from Whitehorse (Porsild, 1951). MAP 20.

Carex atratiformis* Britt. ssp. *Raymondii* (Calder) Porsild, *stat. nov.

C. Raymondii Calder, Rhodora 54: 246 (1952), fig. 1 (map).

Vicinity of Mackintosh, No. 7425; Haines Rd., near outlet of Kathleen Lake, elev. 2,400 ft., Spetzman, No. 1962-107. Apparently rare in Yukon where it was reported previously as *C. atratiformis* Britt., from the Pelly Mts., Frances R., and Dawson (Porsild, 1951).

C. Raymondii, distinguished from *C. atratiformis* Britt. mainly by its two-coloured reddish-brown spikes, on taxonomic as well as on phytogeographic grounds seems best considered a western race of the latter. The combined ranges of *C. atratiformis* and ssp. *Raymondii* conform closely to those of hundreds of other N. American boreal forest species, having a continuous range from Labra-

dor westward to Alberta and the southern Mackenzie drainage, becoming progressively less common in the Northwest, barely entering Alaska, and lacking in B.C., or at least not reaching the Pacific Coast. (For a discussion of this type of distribution, see Porsild, 1958 and 1961.) MAP 21.

Carex atosquama Mack.

Haines Rd., alpine slopes a few miles north of the B.C. border, elev. 4,500 ft. Porsild, No. 22325. In Yukon otherwise reported as common in the Pelly and Selwyn Mts. (Porsild, 1951). MAP 22.

Carex bicolor All.

Silty margin of spruce bog near Bear Creek, No. 7478. In Yukon previously reported from gravelly river flats in the Pelly Mts. (Porsild, 1951).

Carex capillaris L.

Mountain tundra above Vulcan Creek, on damp frost boils, elev. 5,000 ft. No. 8225. In Yukon previously reported from a few alpine stations along the Canol Rd. (Porsild, 1951).

Carex capillaris L. ssp. *robustior* (Lge. ex Drej.) Böcher

Vicinity of Mackintosh in and around spruce bog, Nos. 7488 and 7598. Tall, robust specimens with culms up to 37 cm tall. Not previously reported from Yukon although collected in 1944 at Burwash Landing, Kluane Lake, Clarke, No. 149 (CAN).

Carex circinata C. A. Mey.

Slims R. south of Kluane Lake, alpine tundra, elev. 4,800 ft., Spetzman, No. 1962-81. A Pacific coast species otherwise known from the Aleutian Islands, thence east and south along the south coast of Alaska, Queen Charlotte Islands, to Olympic Peninsula, Wash.

Carex eleusinoides Turcz. ex Kunth, Enum. Pl. 2, p. 407 (1837).

C. kokrinensis Porsild in Rhodora 41: 206, tab. 551, fig. 1-3 (1939); Nat. Mus. Canada Bull. 121: 121(1951); Gjaerevoll, Kgl. Norske Vidensk. Selsk. Skr. 5: 50-51, map fig. 14 (1958).

Gjaerevoll (loc. cit.) pointed out that *C. kokrinensis* Porsild, described from Kokrines Mts., Alaska, and in Yukon reported from MacMillan R., cannot be separated from *C. eleusinoides* Turcz. An examination of authentic specimens at Kew, in 1962, convinced me of the correctness of this statement. According to Fl. USSR the Asiatic range of *C. eleusinoides* is Anadyr, Angara-Sajan, Amur, Kamchatka, and N. Mongolia. To the N. American range given in Gjaerevoll's map should be added one Alaska station from Shungnak R. tributary to Kobuk east of Kotzebue Sd., E. Lepage, No. 25424 (CAN). MAP 23.

Carex Franklinii Boott

Alsek Valley, 8 miles west of Mackintosh, on damp limestone slope, No. 7548. A rare and little collected species of peculiar distribution, in Yukon otherwise known from a single station in the Pelly Mts. (Porsild, 1951). MAP 24.

Carex glacialis Mack.

McQuesten Area, between Clear Creek and Little Klondike R., on ridge top, elev. 4,500 ft., J. D. Campbell, No. 643. Apparently a rare species in Yukon, thus far collected only a few times in the Pelly Mts. and the Dawson Dist. (Porsild, 1951).

Carex Lyngbyei Hornem. ssp. *cryptocarpa* (C. A. Mey.) Hult.

South of Carcross, on damp lakeshore west of Wheaton R., A. E. & R. T. Porsild, Nos. 18434-5, Spetzman, No. 1962-88. A Pacific coast species rarely found far from the sea-coast and not previously collected in Yukon.

Carex maritima Gunn.

Jacquot I., Kluane Lake, sandy lakeshore, Spetzman, No. 1962-85; sandy places near outlet of Kluane Lake, *idem*, No. 1962-87; Donjek R., south of Wellesley Lake, on sandy floodplain, Spetzman, No. 1962-88.

Carex maritima Gunn. ssp. *yukonensis* ssp. *nova*

Culmus 12-44 cm altus. *Folia plana vel plicata culmo breviora. Capitulum globoso-ovatum 1.5-2.0 cm longum, 0.8-1.0 cm latum; utriculi subinflati 4-4.5 mm longi, glabri, enervosi.*

YUKON: Between Bear Creek and Pine Creek in calcareous silty places in and around spruce bog, Nos. 7619 (Type) and 7491; south end of Kluane Lake, Anderson, No. 9369 (in part) (CAN); Kluane Lake, Burwash Landing, common on gravelly lakeshore, Spetzman, No. 1962-86. ALASKA: Nenana Valley near Lignite, 63° 55' N, 149° W, A.E. & R.T. Porsild, No. 285.

Throughout its N. American range typical *C. maritima* is mainly a littoral species closely associated with sandy or gravelly sea-beaches, although occasionally found some distance from the sea on turfy limestone barrens (Fernald, 1933) or as "lingering relics" on sandy shores of lakes formerly connected to the sea or, in the Arctic, on owl perches or near bird cliffs (Porsild, 1955). In addition, a coarse high-grown inland race is found very locally, in Yukon and Alaska, distinguished by up to 44 cm tall culms, 1.5-2.0 cm long and 0.8-1.0 cm broad spikes, and up to 4.5 mm long perigynia. This giant inland race was reported erroneously as *C. incurviformis* Mack. (Porsild, 1951). The latter, however, is a well-marked, always dwarf species, thus far known only from high mountains of Alberta and British Columbia, and clearly distinct from *C. maritima* by its narrow pistillate scales and prominently nerved and barely inflated perigynia.

Carex microchaeta Holm

Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-97. (For a discussion of this taxon and its relation to *C. nesophila* Holm, *C. podocarpa* R. Br., and *C. Tolmiei* Boott, see Porsild, 1951, p. 117-119.) MAP 25.

Carex microglochin Wahlenb.

On muddy silt near Bear Creek, No. 7492. In Yukon collected a few times in the Pelly Mts. (Porsild, 1951) and at Kluane Lake, Anderson, No. 9352 (CAN).

Carex microptera Mack.

Between Bear Creek and Pine Creek, mainly on disturbed soil along pipeline clearing through spruce forest, No. 7642. The present collection closely matches specimens from southern Alberta and British Columbia verified by K. K. Mackenzie. Although many other Rocky Mountain grassland species have widely disjunct stations in Yukon, the habitat of No. 7642 suggests that it may be a recent introduction (*See also* Porsild, 1962).

Carex Parryana Dew.

Vicinity of Mackintosh, margin of alkali flat, Nos. 7657 and 8177. A prairie

species, which in Yukon has been reported previously from Whitehorse and Kluane Lake. The Yukon population is disjunct by more than 1,000 miles from the nearest station for this species in interior British Columbia (Porsild, 1951). MAP 26.

Carex petricosa Dew.

Ogilvie Mts. south of Chapman Lake, Youngman and Tessier, No. 376. In Yukon otherwise reported only from Rose-Lapie River on the Canol Rd. (Porsild, 1951).

Carex phaeocephala Piper

Haines Rd. near Klukshu, on grassy subalpine slope, A.E. & R.T. Porsild. No. 22312. A Cordilleran species not previously reported from Yukon but known far north of its main range from Brintnell Lake in the Mackenzie Mts. (Raup, 1947) and from the upper Peace R. (Raup, 1934, in part). MAP 27.

Carex praegracilis Boott

Vicinity of Mackintosh, in open alkali meadow in woodland, No. 8179. Near Carcross, in salt meadow, Porsild, No. 18421. In Yukon otherwise known from Dawson and Whitehorse (Porsild, 1951). MAP 28.

Carex rupestris All.

Dry alpine slopes of Mt. Archibald, elev. 4,000 ft., No. 7933; Slims R. south of Kluane L., alpine slopes, elev. 4,800 ft., Spetzman, No. 1962-89A; Kluane Lake, alpine tundra south side of Talbot Arm, elev. 5,000 ft., *idem*, No. 1962-91; west side of Dogpack Lake, elev. 5,300 ft., *idem*, No. 1962-92; north side of Koidern Mt., in alpine tundra, *idem*, Nos. 1962-94 and 95. An arctic species in Yukon otherwise known from the Arctic Coast and from a few alpine stations in the Pelly Mts. (Porsild, 1951).

Carex sabulosa Turcz. ssp. *leiophylla* (Mack.) *stat. nova*.

C. leiophylla Mack. in N. Am. Flora 18, 6: 365 (1935); *idem* in N. Am. Cariceae, Tab. 423 (1940).

C. sabulosa Turcz. ex Kunth, Enum. Pl. II, p. 432 (1837).

C. melanantha C.A. Mey. var. γ *sabulosa* (Turcz.) Kük. in Pflzr. IV, 20: 392 (1909).

The type locality of *C. leiophylla*, still the only known station for this striking sedge, is near Carcross in southern Yukon District, where it was first collected in 1914 by Alice Eastwood (No. 725) and where it has since been taken by a few recent collectors. In 1951 I found *C. leiophylla* growing abundantly on sand dunes and in blow-outs along roads west of Carcross and along the shores of nearby Lake Bennett (Porsild. Nos. 18422 and 18489). By its long, tenacious and wiry rhizomes it is a successful sand binder and forms large, durable hillocks several feet high. The up to 35 cm tall culms are weak and arching, causing the large fruiting heads to touch the sand. In the Carcross dunes *C. leiophylla* was associated with the endemic but doubtfully distinct *Lupinus Porsildianus* C. P. Smith and *L. Jacob-Andersonii* C. P. Smith. On August 24-26 the large, fully mature fruits of the sedge were blown freely about by a strong wind.

A comparison of *C. leiophylla* from Carcross with a sedge from the Lena Delta, lat. 71° 05' N, 26 June, 1956, leg. T. Polosova & B. Jurtzev and lat. 71°

55' N, 18 Aug., 1957, leg. B. Norin & V. Petrovsky, distributed as *C. sabulosa* Turcz. by the Herbarium of the Botanical Institute of the USSR, Leningrad, shows that the two plants are quite similar, but differ markedly from *C. sabulosa* from Lake Baikal. It is of interest therefore to note that Ledebour, in Fl. Ross. IV: 286 (1853), placed *C. sabulosa* in synonymy under *C. alpina* Sw. The description (loc. cit.) presumably is copied from Turczaninov's Cat. Baikal, No. 1230 "*in sabulosis ad thermas Turkensis*," and clearly matches *C. sabulosa* Turcz. ex Bess., Exsicc. Fl. USSR No. 3802 from Lake Baikal and also Fl. USSR Vol. 3, Tab. 16, 4. The Baikal plant, by its broader and flat leaves, its stiffer and erect culms, and interrupted inflorescence, differs strikingly from the Lena Delta plant, as well as from *C. leiophylla* from Carcross. MAP 29.

Carex stans Drej.

Sphagnum bogs on slopes of Mt. Decoeli, No. 8063. An American arctic species which, outside its main area, thus far is known only from a few widely disjunct high-alpine stations through the Rocky Mountains south to Colorado and Wyoming. In Yukon previously reported from the Mackenzie-Yukon Divide (Porsild, 1951).

Carex stenophylla Wahlenb. ssp. **Eleocharis** (Bailey) Hult.

Dry hillsides near Mackintosh, Nos. 7432 and 7765; Kluane Lake, Burwash Landing, near airstrip, Spetzman, No. 1962-90. A prairie species which in Yukon otherwise is known from a few stations on the dry, interior plateau (Porsild, 1951). MAP 30.

Eleocharis pauciflora (Lightf.) Link var. **Suksdorfiana** (Beauv.) Svens.

Vicinity of Mackintosh, on calcareous, muddy flats in open spruce woods, No. 8165. A species of boreal forest range which is rare and local in the Northwest where it has been collected only a few times, and mainly near warm springs (Porsild, 1951 and 1961). MAP 31.

Eriophorum callitrix Cham.

In moist places between Bear Creek and Pine Creek, No. 7645. The collection is the first in Yukon.

Eriophorum triste (Th. Fr.) Hadač

Mt. Bratnober, elev. 5,000 ft., in wet tundra below snowfield, Spetzman, No. 1962-78. An otherwise arctic species previously collected in SW. Yukon at Burwash Landing, Kluane Lake, alpine slopes above timberline, C. H. D. Clarke, No. 221 and on Haines Rd. Mile 85, *idem*, No. 557 (see map Porsild, 1955) and recently reported from mountains of central Alaska, Gjaerevoll (1958, map fig. 12).

Eriophorum vaginatum L.

Beaver Creek, in a muskeg, Spetzman, No. 1962-76; Dogpack Lake, elev. 3,000 ft., in muskegs, *idem*, No. 1962-77. The range of *Eriophorum vaginatum*, like that of *Picea mariana* with which it is commonly associated, is rather peculiar in Yukon. Both species are generally restricted to cold and poorly drained bogs containing permafrost. In 1944 the writer (Porsild, 1951) noted the absence of *Eriophorum vaginatum* in extensive black spruce muskegs along the Canol Rd. west of the Mackenzie-Yukon Divide. Both species apparently are lacking, or at least are very local, in the dry interior of southwestern Yukon.

***Kobresia hyperborea* Porsild**

Dry alpine saddle above Vulcan Creek near south end of Kluane Lake, elev. 5,400 ft., No. 8207. In Yukon previously known only from the Arctic Coast. The new station represents a new southern limit for this endemic of arctic northwest America.

***Kobresia myosuroides* (Vill.) Fiori & Paol.**

In damp places near Mackintosh, No. 7423. Circumpolar arctic-alpine, in Yukon, otherwise known from a few collections along the Arctic Coast, from alpine situations in the Pelly Mts., and from Kluane Lake (Porsild, 1951).

***Kobresia simpliciuscula* (Wahlenb.) Mack.**

Vicinity of Mackintosh, in calcareous spruce bogs, Nos. 7771 and 8158. In Yukon otherwise known only from a single station in the upper Pelly R. (Porsild, 1951).

***Scirpus Rollandii* Fern.**

S. pumilus sensu Am. auths., not Vahl.

Damp mossy places in calcareous swamp in spruce woods near Mackintosh, No. 8164. The collection is a first record from Yukon and represents a notable farther westward extension of the known range of this species recently reported from Liard Hotsprings in northern B.C. (Porsild, 1961). A second B.C. collection, from Alaska Highway, Mile 397, A. Szczawinsky, July 20, 1961 (CAN) was distributed as *S. caespitosus* L. var. *callosus* Big. MAP 32.

***Calla palustris* L.**

Bell River, one mile southwest of Lapierre House, Youngman and Tessier, No. 528.

Although fairly common along the Mackenzie River valley, north to the Delta, *Calla palustris* has been collected only a few times in Yukon, in acid bogs, mainly in the central and unglaciated central plateau.

***Lemna minor* L.**

Vicinity of Mackintosh, floating in small pools in hummocky forest tundra. No. 8180. The collection is the first from Yukon and bridges a nearly 800-mile gap between stations in southwest Alaska and southern Mackenzie District. MAP 33.

***Lemna trisulca* L.**

In alkaline pond near Sulphur Lake, Mile 1038, No. 8026. In Yukon previously known from collections along the Canol Rd. in the valleys of Pelly and Ross rivers (Porsild, 1951). MAP 34.

***Juncus albescens* (Lge.) Fern.**

Apparently common in calcareous bogs in the vicinity of Mackintosh where the following fine series was obtained: Nos. 7484, 7745, 7984, 7986, and 8098. In Yukon otherwise known from several stations in the Pelly Mts. (Porsild, 1951).

***Juncus balticus* L. var. *littoralis* Engelm.; *J. ater* Rydb.**

In seepy places near Summit Creek, No. 7527; Champagne, wet swale in sand dunes, elev. 2,000 ft., Spetzman, No. 1962-72; Carcross, in a bog, Porsild, No. 18457; vicinity of Mackintosh, near Summit Creek, No. 7527. Typical

specimens with stout rhizomes, highly coloured prominent sheaths, and 2 mm long anthers. In the same area was collected typical *J. balticus* var. *alaskanus* (Hult.) Porsild of characteristically more caespitose habit and with 1 mm long anthers on distinct filaments (Nos. 7581 and 8017). In Yukon previously reported from Whitehorse, Teslin Lake. (For a discussion of this taxon and *J. balticus* var. *alaskanus*, see Porsild, 1951.) MAP 35.

***Juncus biglumis* L.**

Damp slopes between Mt. Decoeli and unnamed mountain to the south, elev. 4,600 ft., No. 8143; on damp frost boils above Vulcan Creek south of Kluane Lake, elev. 5,400 ft., No. 8230. Circumpolar arctic species, in Yukon otherwise known from high granitic mountains along the Canol Rd. (Porsild, 1951).

***Juncus Drummondii* E. Mey.**

Cold seepage near Bear Creek Summit, elev. 3,000 ft., No. 7902. In Yukon otherwise known only from high-alpine situations along the upper Canol Rd. MAP 36.

***Luzula multiflora* (Retz.) Lej. ssp. *frigida* (Buch.) Krecz. var. *contracta* Sam.**

Margin of alpine pool on slope above Vulcan Creek south of Kluane Lake, No. 8216. *L. multiflora* apparently is very rare in Yukon where, otherwise, a single previous collection, also of this race, has been reported from the Mackenzie-Yukon Divide (Porsild, 1951). MAP 37.

***Luzula nivalis* (Laest.) Beurl.**

Dampish cliff crevices on alpine slopes above Vulcan Creek south of Kluane Lake, elev. 5,400 ft., No. 8238. An arctic species in Yukon known from the Arctic Coast and from a single alpine inland station on the Pelly Mts. (Porsild, 1951).

***Luzula nivalis* var. *latifolia* (Kjellm.) Sam.**

L. beeringiana Gjaerevoll, Kgl. Norske Vidensk. Selsk. Skr. 1958, 5, p. 63; *L. tundricola* Gorodk. in Vassiliev. Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS 15:40 (1953).

Damp alpine slopes between Mt. Decoeli and unnamed mountain to the south, elev. 3,800 ft., No. 8141; Ogilvie Mts. south of Chapman Lake, Youngman and Tessier, No. 493. An Amphi-Beringian arctic race extending through northern Alaska eastward to a short distance beyond the Mackenzie Delta (Porsild, 1951). In Yukon known previously from the Arctic Coast only, but reported from the White Mountains of Central Alaska by Gjaerevoll (loc. cit.) and from the south end of the Mackenzie Mts., N.W.T. (Porsild, 1961a). MAP 38.

***Luzula spicata* (L.) DC.**

Moist alpine slopes of Mt. Archibald, elev. 4,000 ft., Nos. 7862 and 7954; alpine slopes along Haines Rd. near the B.C. border, No. 8291; alpine slope above Vulcan Creek south of Kluane Lake, elev. 5,400 ft., No. 8215. An arctic-alpine species, in Yukon previously reported from high mountains along the Canol Rd. (Porsild, 1951).

***Allium Schoenoprasum* L. var. *sibiricum* (L.) Hartm.**

Haines Rd., Kathleen Lake, wet gravelly lakeshore, Spetzman, No. 1962-

34. In Yukon reported from a number of stations along the Yukon and its tributaries but apparently not reported previously from the southwestern part of the Territory. MAP 39.

Lloydia serotina (L.) Rchb.

Alpine slopes of Mt. Archibald, elev. 4,000 ft., No. 7939; alpine slopes between Mt. Decoeli and unnamed mountain to the south, elev. 4,500 ft., No. 8150, north side of Koidern Mt., elev. 4,300 ft., Spetzman, No. 1962-32; Kluane Lake, *idem*, No. 1962-33. In Yukon long known only from the Arctic Coast (Porsild, 1951), *Lloydia serotina* is now also known from the Mayo District: Bostock, Nos. 38 and 203, and from mountains north of McQuesten R., Christie, No. 23. MAP 40.

Tofieldia coccinea Richards.

North side of Koidern Mt., alpine tundra, elev. 4,800 ft., Spetzman, No. 1962-29. In Yukon otherwise known from a single collection from Burwash Landing (Porsild, 1951).

Streptopus amplexifolius (L.) DC. var. *americanus* Schultes

Alder thicket near Mackintosh, No. 7807. In Yukon otherwise known only from a few stations in the Pelly Mts. (Porsild, 1951). MAP 41.

Veratrum Eschscholtzii A. Gray

Slopes of Mt. Decoeli among willows on stream bank, No. 8045. In Yukon otherwise known only from alpine herbmats along Canol Rd. (Porsild, 1951). MAP 42.

Sisyrinchium angustifolium Miller

Near Mackintosh, No. 7412. In Yukon previously known from nearby Haines Junction (Porsild, 1951). MAP 43.

Habenaria dilatata (Pursh) Hook.

Alsek valley 8 miles west of Mackintosh, on silty river meadow, No. 7555; alpine meadow near Mile 84 on Haines Rd., No. 7973A. In Yukon otherwise known only from Whitehorse and the MacArthur Range (Porsild, 1951). MAP 44.

Orchis rotundifolia Banks

Dry spruce forest near Pine Lake, No. 7652; willow thicket 4 miles southwest of Mackintosh, No. 8983. In Yukon until recently reported only from the Dawson District and from a few stations in the Pelly Range, *Orchis rotundifolia* is now known also from Whitehorse, Anderson, No. 9634; Stewart R., J. D. Campbell, No. 252; Mayo District, Bostock, No. 42; Pelly R., Gull Creek, Bostock, No. 161; 20 miles below Selkirk, Malte, No. 86. MAP 45.

Salix alaxensis (Anders.) Cov.

Near Mackintosh, 10-foot shrubs by margin of stream, No. 8309; gravel bar in stream toward Alsek Lake, shrub 10 feet high, No. 8319; Kluane Lake, Jacquot I., with mature catkins, June 29, Spetzman, No. 1962-120; junction of White and Koidern rivers, *idem*, No. 1962-126. In Yukon previously recorded from Dawson, Whitehorse (Hultén, 1943), from the Pelly Mts. (Porsild, 1951), and from the Arctic Coast.

***Salix candida* Flügge**

Low, erect shrub in calcareous fen near Mackintosh, No. 8310. In Yukon otherwise reported from Whitehorse (Porsild, 1951). MAP 46.

***Salix Dodgeana* Rydb.**

Open gravel patches on alpine slope above Vulcan Creek south of Kluane Lake, elev. 5,600 ft., No. 8226; Slims R., limestone tundra, Spetzman, No. 1962-114. This tiny species, long known only from high peaks of Wyoming and Montana, was recently reported from Sekwi R. in the Mackenzie Mts., N.W.T. (Raup, 1959). The report is based on specimens originally referred to the closely related *S. phlebophylla* (Porsild, 1945). Besides the Sekwi R. station (Porsild, No. 11800), the following collections from Alaska, all in the National Herbarium of Canada, should probably also be referred to *S. Dodgeana*: Seward Pen., Nome, Porsild, No. 1328; Bluff, Porsild, No. 1211; McKinley National Pk., Norand, No. 583; North Slope, Sadlerochit R., Spetzman, No. 968, all distributed as *S. rotundifolia*. MAP 47.

***Salix glacialis* Anders.**

Alsek valley toward Alsek Lake, on gravelly beach, No. 8320. Long, trailing branches from a thick base; mature bark yellowish-brown and shiny; leaves oblanceolate, entire, 2-2.5 cm long and half as wide, rounded or subacute, glabrous above, glaucous and thinly pubescent beneath; pistillate catkins 2-4 cm long, on leafy peduncles; bracts very short, chestnut brown; capsules pale grey, pubescent; style very short. Except for the somewhat longer pistillate catkins, our plant thus closely agrees with the descriptions of *S. glacialis* given by Hultén (1942) and Raup (1959), and with specimens seen in the Leningrad Herbarium from Cape Chaplin in Chukotsk Pen., Siberia. According to Hultén (1942) *Salix glacialis* is known only from the arctic and western coasts and Alaska, with single stations in Akutan in the Aleutian Islands, and on St. Lawrence Island (See also Raup (loc. cit.) fig. 9).

***Salix interior* Rowlee var. *pedicellata* (Anders.) Ball**

Vicinity of Mackintosh, roadside; erect shrub 3 ft. tall, No. 8023. In Yukon otherwise known from Frances R. on the upper Liard, and from the Dawson District (Porsild, 1951). MAP 48.

***Salix niphoclada* Rydb.**

Apparently common in the vicinity of Mackintosh where the following fine series was obtained: Nos. 7567, 7677, 7684, 7743, 7924, 8313, and 8315. Slims R. south of Kluane L., in alpine tundra, elev. 4,800 ft., Spetzman, No. 1962-121A.

***Salix planifolia* Pursh**

Mackintosh, in alkaline bog, No. 8316; Kluane L., Burwash Landing, Spetzman, No. 1962-124B. An eastern boreal forest species common in south-eastern Yukon (Porsild, 1951) but apparently not reaching Alaska, although the present collection extends the known range almost to the Alaska border.

***Salix Setchelliana* Ball**

Alsek valley, 8 miles west of Mackintosh, on silty outwash, No. 7568; Kluane Lake, Burwash Landing, flowering on June 19, Spetzman, No. 1962-12;

Jacquot I., sandy lakeshore, *idem*, No. 1962-113. In Yukon previously reported from Kluane Lake and Donjek R. (Hultén, 1943). MAP 49.

Myrica Gale L.

McQuesten Area, Beaver Creek valley by edge of bog pond, J. D. Campbell. No. 304. Apparently uncommon in Yukon where otherwise it has been collected only a few times in the Dawson and Mayo districts (Porsild, 1951). MAP 50.

Urtica gracilis Ait.

Klukshu village, near campsite streams, No. 8298. An anthropochorous species, in Yukon previously reported from the Dawson District (Porsild, 1951). MAP 51.

Polygonum alaskanum (Small) Wight

Junction of Quill Creek Rd. and Alaska Highway (Löve, 1956). MAP 52.

Rumex Acetosa L. ssp. *alpestris* (Scop.) Löve

Upper Quill Creek (Löve, 1956).

Rumex occidentalis Wats.

Damp places in the vicinity of Mackintosh, Nos. 7553, 7997, and 8191. In Yukon otherwise reported from the Canol Rd. and the Dawson District (Porsild, 1951). MAP 53.

Chenopodium rubrum L. var. *humile* (Hook.) Wats.

Near Mackintosh, in wet depressions in alkali meadow in spruce woodland. No. 8167. In Yukon otherwise known from a single collection on the upper Pelly R. (Porsild, 1951).

Suaeda maritima (L.) Dum.

Alkaline flats near Mackintosh, No. 7674; near south end of Kluane Lake, No. 7784. In Yukon also reported from Carcross and from Mile 945 on the Alaska Highway (Porsild, 1951). MAP 54.

Claytonia Bostockii Porsild, Nat. Mus. Canada Bull. 121: 160-161, tab. 17, figs. 3, 4 (1951).

Alpine meadows on Mt. Decoeli, among willows, No. 7964; same place, open mossy tundra, elev. 4,100 ft., No. 8048; wet mossy tundra above Vulcan Creek south end of Kluane Lake, elev. 5,000-6,000 ft., No. 8219; Upper Quill Creek (Löve, 1956). The fine flowering material in the Crum and Schofield collection is a perfect match for the type collection from the Dawson Range near the headwaters of Klaza R., until now the only known station for this attractive and distinct species. MAP 55.

Claytonia sarmentosa C. A. Mey.

Haines Rd. Mile 100, wet margin of alpine streamlet, elev. 5,300 ft., No. 8268; alpine slopes of Mt. Decoeli, by margin of alpine streamlet, No. 8087; wet, mossy tundra above Vulcan Creek south of Kluane Lake, elev. 5,000-6,000 ft., No. 8224; Mt. Bratnober, wet, mossy tundra below snowfield, elev. 5,000 ft., Spetzman, No. 1962-135. In Yukon otherwise known from a few collections on the Haines Rd., and from the Pelly Range (Porsild, 1951). MAP 56.

Montia lamprosperma Cham.

In Yukon thus far known from a single collection along the Arctic Coast

(Shingle Pt., Porsild, No. 7096) and shown on map No. 131 (Porsild, 1957).

***Arenaria humifusa* Wahlenb.**

South of Carcross, rare in springy places on wooded slope south of Wheaton R. crossing, elev. 5,000 ft., A.E. & R.T. Porsild, No. 18461. In Yukon previously reported from a few widely scattered stations on Haines Rd., near Dawson City, and on the Canol Rd. (Porsild, 1951).

***Arenaria macrocarpa* Pursh**

Tundra slope above Vulcan Creek south of Kluane Lake, No. 8288, with flowers and almost mature capsules on August 8; Mt. Bratnobar, in alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-145. In Yukon otherwise known only from the Arctic Coast (Porsild, 1951). MAP 57.

***Arenaria obtusiloba* (Rydb.) Fern.**

Alpine slopes 4 miles up the Dezadeash R. from Mackintosh, No. 7395; alpine slopes of Mt. Archibald, forming large cushions, Nos. 7861 and 7953; on top of ridge near Sulphur Lake, Mile 1038, No. 8034; west side of Kluane Lake, on granite cliffs, elev. 4,800 ft., Spetzman, No. 1962-149. In Yukon otherwise known from Yukon R., Five Finger Rapids (Hultén, 1943), and from two stations in the Dawson District (Porsild, 1951). MAP 58.

***Arenaria Rossii* R. Br. ssp. *elegans* (C. & S.) Maguire**

Alpine slopes of Mt. Archibald, on small frost boils, elev. 4,000 ft., No. 7941; Koidern Mt., in alpine tundra, elev. 4,300 ft., Spetzman, No. 1962-150. According to Maguire (1958), *A. Rossii* in Alaska and Yukon is represented by the Amphi-Beringian race, ssp. *elegans*. A single collection (Porsild, No. 10615) of the Cordilleran ssp. *columbiana* var. *apetala* was, however, reported by Maguire (loc. cit.) from Pelly Range, where it grew in a population of ssp. *elegans*. Furthermore, a single specimen from near Dogpack Lake (61° 40' N – 139° W), Spetzman, No. 1962-148, is clearly referable to ssp. *Rossii*, as is a local population noted by the writer in Summit Pass, Alaska Highway, northern British Columbia.

***Arenaria uliginosa* Schleich.**

Southeast end of Kluane Lake, elev. 2,600 ft., Spetzman, No. 1962-147.

An eastern arctic species, previously reported in Yukon from a number of places in the Pelly Range (Porsild, 1951).

***Melandrium apetalum* (L.) Fenzl. ssp. *attenuatum* (Farr) Hara in J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. Vol. 6, 2: 42 (1952).**

Lychnis attenuata Farr in Trans. & Proc. Bot. Soc. Penna. 1: 419 (1904).

L. apetala L. ssp. *attenuata* Maguire, in Rhodora 52: 236 (1950).

Damp gravel slopes between Mt. Decoeli and unnamed mountain to the south, elev. 4,000 ft., Nos. 8140 and 8146, fruiting specimens on Aug. 2; slopes of Mt. Decoeli, elev. 4,500 ft., No. 8081; Mt. Archibald, alpine scree slope, No. 7837, flowering and fruiting specimens on July 17; Slims R. south of Kluane L., alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-140.

Caespitose, from a stout tap-root, in older specimens terminating in a branching crown from which rise numerous shoots, each bearing a well-developed rosette of oblanceolate, long-petioled leaves, and terminating in a slender, often somewhat flexuous and arched flowering stem bearing 2 or 3 pairs of

linear, sessile leaves and a single flower (very rarely a smaller lateral flower occur in one of the axils of the uppermost pair of stem leaves). Leaves glabrous or nearly so, except for the ciliate margins; stem, peduncle, and calyx villous from grey, or purplish tinted moniliform; non-glandular hairs. At the time of flowering the peduncles barely exceed the basal leaves but elongate as the fruit matures, ultimately attaining a height of 10 to 15 cm. The flowers which are nodding in anthesis become erect toward maturity. The considerably exserted limbs of the petals are pale to dark purple; the inflated calyx and the winged seeds are similar to those of *M. apetalum* ssp. *arcticum*.

Whereas the preference of ssp. *arcticum* is for rather wet tundra, *attenuatum* always grows in well-drained places, most commonly in not very coarse slide-rock screes. The presence of much-branched and elongated caudices, so often seen in the subspecies, clearly is an adaptation to such habit. In Banff National Park this plant is of rather local occurrence, known to me from only a score of stations, all well above timberline, on calcareous scree commonly associated with such equally rare or local scree-species as *Dryas ventosa* and *D. Paysonii* var. *Treleasii*, *Senecio Fremontii*, *Crepis nana*, and *Saussurea densa*.

The Rocky Mountain plant clearly represents a rather distinct geographic race, differing in growth-form, pubescence, and ecology from *M. apetalum* as well as from its ssp. *arcticum*, both of which, incidentally, are totally lacking in Alberta and British Columbia as well as in the northward extension of the Cordillera in the Mackenzie Mountains, and very rare in mountain ranges of the interior Yukon and eastern Alaska. Although in my opinion the Rocky Mountain plant could well be considered distinct, I think it undesirable, at this time, to make the transfer from *Lychnis* to *Melandrium*.

Long known only from high mountains of southern Alberta, ssp. *attenuatum* was next reported from mountains of the Peace River District of Northern British Columbia (Raup, 1934). The following additional widely disjunct stations extend its known range to N.W.T., Yukon, and Alaska: Mackenzie Mts. Brintnell Lake, N.W.T., Raup & Soper, No. 9659 (Raup, 1957, reported as *Lychnis apetala*); Bolstead Creek, Mackenzie Mts., lat. 64° 27', long. 128° 15' W. Wynne-Edwards Nos. 8285-6 (Porsild, 1945, reported as *Melandrium macrocarpum*); south slope of Brooks Range near Wiseman, Alaska, J. H. Jordan No. 2402. MAP 59.

Melandrium Ostenfeldii Porsild

Floodplain, Donjek R., elev. 2,000 ft., Spetzman, No. 1962-143. In sand dune hollows along Lake Bennett, A.E. & R.T. Porsild, No. 18495. Endemic to northwestern Canada, in Yukon previously reported from Lapie R. in SE Yukon (Porsild, 1951). MAP 60.

Melandrium taimyrense Tolm.; *M. Dawsonii*, Hult. Fl. Al. and Yukon 4: 70 (1944).

Dry ridges and hilltops near Mackintosh, Nos. 7331, 7415, and 7769. Champagne, sunny, dry, sandy slope, elev. 2,000 ft., Spetzman, No. 1962-142. Tall, mostly 3-flowered stems, in large specimens with up to 25 stems from one strong tap-root; seeds very small, prismatic, with pebbly or almost smooth testa. New to the flora of Yukon. (For a discussion of this taxon and its relation to *M. Dawsonii* Hult., see Porsild, 1943 and 1951.) MAP 61.

Stellaria alaskana Hult.

Reported from upper Quill Creek by Löve (1956). MAP 62.

Stellaria calycantha (Ledeb.) Bong.

Lapierre House, approx. 66° 40' N, Youngman and Tessier, No. 610. In Yukon not reported previously from north of Dawson.

Stellaria longipes Goldie.

For a revision of Yukon material of this and related species see Porsild, 1963.

Nuphar polysepalum Engelm.

In ponds near Lapierre House, approx. 66° 40' N, flowering specimens on Aug. 1, Youngman and Tessier, No. 613. In Yukon previously reported only from a few stations along the Canol Road and McQuesten River (Porsild, 1951). The scarcity of *Nuphar* specimens in herbaria is partly due to the difficulty facing the field botanist in obtaining good material without access to a boat. Also, *P. polysepalum* and the eastern *P. variegatum* have strong preference for small, quiet lakes and streams in which the water is always clear and of low pH value. For this reason the yellow pond-lily is commonly found near the headwaters of small streams rather than along main rivers subject to spring flooding. The rhizomes and also other parts of the plant are the choice food of beaver and moose, who may accidentally distribute the seeds of both species.

Actaea rubra (Ait.) Willd.

Vicinity of Mackintosh, near streamlet between Bear Creek and Pine Creek, No. 7631; Haines Rd. in wet places among willows near Dezadeash Lake, A.E. & R.T. Porsild, No. 22303. In Yukon otherwise known from a few stations in Pelly Mts. and from Haines Rd. near the B.C. border. MAP 63.

Anemone Drummondii S. Wats.

Alpine slopes of Mt. Archibald, No. 7914; Dezadeash Valley, 4 miles from Mackintosh, alpine slopes, fruiting specimen on June 30, No. 7403; base of cliff in spruce forest, Alsek valley 8 miles west of Mackintosh, No. 7547, Dogpack Lake, limestone tundra, Spetzman, No. 1962-168; Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-71. In Yukon otherwise known from the Arctic Coast and from the Pelly Mts. MAP 64.

Ranunculus aquatilis L. var. *eradicatus* Laest.

Slopes above Vulcan Creek south of Kluane Lake, elev. 4,800 ft., flowering specimens completely submerged in alpine pool, No. 8193. In Yukon otherwise reported from the Pelly Mts. (Porsild, 1951).

Ranunculus circinatus Sibth. var. *subrigidus* (Drew) Benson

Submerged in small lake on slopes of Mt. Archibald, elev. 4,000 ft., flowering on July 20, No. 7957; submerged in pond near Alsek Lake, flowering specimens on August 7, No. 8190. The collections are the first from Yukon but since first reported from the Canadian Arctic (Porsild, 1943) we have now a second arctic collection, from McDougall Pass in the Mackenzie Mts. west of the Mackenzie Delta, Youngman & Tessier, No. 109.

Ranunculus Cymbalaria Pursh

Damp places in alkaline meadows near Bear Creek, No. 7629; near Kluane

Lake, No. 7780. Although in Yukon previously reported only from Whitehorse and from the Yukon valley, this species appears to be common on alluvial river flats and in meadows of SW. Yukon.

***Ranunculus gelidus* Karel. & Kiril.**

Dry slopes between Mt. Decoeli and unnamed mountain to the south, No. 8107. The present collection of this rare species bridges a very large gap between the main N. American area in southern Canadian Rockies and its widely distributed stations in northwestern N. America, of which the nearest are in McKenzie Park, Alaska, the arctic coast of Yukon, and the Richardson Mountains west of the Mackenzie Delta (Porsild, 1943 and 1951). MAP 65.

***Ranunculus Gmelini* DC.**

Lapierre House, approx. lat. $66^{\circ} 40' N$, by the edge of a small pond, flowering on August 1, Youngman and Tessier, No. 616. Although not reported from Yukon north of the central plateau (Porsild, 1951), it is known from the Mackenzie Delta and from the arctic slope of Alaska.

***Ranunculus nivalis* L.**

Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-159.

***Ranunculus pedatifidus* Sm. var. *leiocarpus* (Trautv.) Fern.; *R. affinis* R. Br.**

Damp bank of stream near Mackintosh, flowering and fruiting specimens on June 29, No. 7336. Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-160. An arctic species which apparently is common in meadows and by streams in the central plateau and in southwest Yukon, but thus far not reported from the central Mackenzie District or the intervening mountains.

***Ranunculus Purshii* Richards.**

Submerged in bog pool near Mackintosh, Nos. 7723 and 8095. In Yukon otherwise reported only from Whitehorse and from Kluane Lake (Porsild, 1951). MAP 66.

***Thalictrum occidentale* Gray; *T. Breitungii* Boivin**

Moist meadow near streamlet along Alsek Valley Rd. 8 miles west of Mackintosh, fruiting specimens on July 5, No. 7539; near Mile 100 on Haines Rd. near Klukshu village, No. 8299; approximately same place, Porsild, No. 22314. In Yukon previously reported from the Haines Rd. and the Pelly Mts. MAP 67.

***Corydalis pauciflora* (Steph.) Pers.**

Duke R. west of Kluane Lake, Spetzman, No. 1962-175. In Yukon previously reported from mountains of the central and eastern parts (Hultén, 1943; Porsild, 1951). MAP 68.

***Papaver Keelei* Porsild**, Nat. Mus. Canada Bull. 101:20 (1945); *ibid.*, 121:186 and tab. xvi, fig. 4-7 (1951).

As predicted (*loc. cit.*) this species has now been discovered in the Ogish Mts. northeast of Dawson, Youngman and Tessier, No. 319, as well as along the Arctic slope of Alaska: Lake Schrader, R. & M. Wood, No. 368; Alatak near Point Barrow, Spetzman, No. 2473; Anaktuvuk Pass, *idem*, No. 1604.

***Papaver McConnellii* Hult.**, Fl. Al. and Yukon, 4:803 and fig. 1 (1945); Porsild, Nat. Mus. Canada Bull. 121:186 (1951).

Yukon Territory, Richardson Mts. 13 miles northeast of Lapierre House, elev. 3,000 ft., flowering on July 27, Youngman and Tessier, No. 592.

The present collection is from near the type locality (by Hultén erroneously recorded as being in the Mackenzie District rather than Yukon).

Hultén noted that the filaments in the type of *P. McConnellii* turn black. This blackening is due to poor preservation of the type specimens and has been noted to occur in those members of the *P. radicum* complex in which the petals turn green in drying. In the beautifully preserved Youngman and Tessier specimens the filaments as well as the base of the petals are yellowish brown, strongly contrasting with the bright yellow petals. MAP 69.

***Papaver Macounii* Greene**

McQuesten Area, headwaters of Parker Creek, north-facing limestone ridge, flowering on August 13, J. D. Campbell, No. 814. In Yukon this tall and large-flowered species is known only from two earlier collections, both from the same general area (Hultén, 1945). MAP 69.

***Papaver radicum* Rottb. s. lat.**

Alpine shale screes of Mt. Archibald, No. 7870; gravel slopes between Mt. Decoeli and unnamed mountain to the south, elev. 5,000 ft., No. 8120; rock crevices above Vulcan Creek near the south end of Kluane Lake, elev. 4,800 ft., No. 8252. The collections cited should probably all be referred to the ssp. *occidentale* Lundstr. which in Yukon appears to be restricted to the Arctic Coast and to high mountains of the interior (Porsild, 1951). Löve (loc. cit.), besides reporting *P. Macounii* Greene, described and illustrated three new species: *P. kluanensis*, *P. nigro-flavum*, and *P. Freedmanianum*, all occurring in the Quill Creek area. Pending further clarification of the taxonomy and nomenclature of the *P. radicum* complex, the writer has not attempted a comparison of these 'new' species with Yukon material in the National Herbarium of Canada.

***Alyssum americanum* Greene**

McQuesten Area, high benches on north bank of Pelly River, J. D. Campbell, Nos. 8 and 37; confluence of Yukon and Pelly rivers, Mrs. M. Lammers, July 1965. A rare plant in N. America, where it is known only from unglaciated parts of central Alaska and Yukon, but, according to Hultén (1945, p. 886), is indistinguishable from *A. biovulatum* N. Busch of Fl. SSSR. 8: 346 (1939) which is *A. sibiricum* sensu N. Busch, in Fl. Sib. et Orient, Extr. p. 550-7 and map vi (1931), non Willd. said to occupy a very large area in central and northern Siberia, from the Urals and Caucasus extending east through mountains of southern Siberia and northern Mongolia to the middle Amur, but thus far not reported from easternmost Siberia or Kamchatka. MAP 70.

***Arabis divaricarpa* A. Nelson**

Vicinity of Mackintosh, No. 7339; Anderson & Brown, No. 10018; Haines Rd., gravelly slopes south of Dezadeash Lake, A.E. & R.T. Porsild, No. 22305; Haines Rd. near Klukshu, in rich subalpine herbmats, A.E. & R.T. Porsild, No. 22315. MAP 71.

***Arabis Drummondii* A. Gray**

Roadsides near Mackintosh, with almost mature siliques on June 29, No. 7348; open places near Mackintosh, No. 7761; among willows on slope between

Mt. Decoeli and unnamed mountain to the south, No. 8116. In Yukon otherwise known from subalpine meadows in the Pelly Mts. and from Atlin Lake (Porsild, 1951). MAP 72.

Arabis hirsuta (L.) Scop. ssp. *pyncocarpa* (Hopkins) Hult.

Dry roadsides near Mackintosh, No. 7340. The writer (Porsild, 1951) found this biennial taxon among the native species that in 1945, the second year of construction of the Alaska Highway, were commonly pioneering on disturbed soil along the highway and near camp-sites. In 1951, and even more so in 1960, *A. hirsuta* ssp. *pyncocarpa* was noted to be spreading rapidly along the highway on roadside fills that remained moist during the early summer. In 1960 fruiting colonies were noted near Whitehorse by the end of June. MAP 73.

Arabis Lemmonii S. Wats.

Alpine shale scree of Mt. Archibald, No. 7831. This fine series, collected on July 17, includes almost mature siliques and a few remaining pink flowers. It is a perfect match for typical *A. Lemmonii* in the southern Canadian Rocky Mountains. The collection represents another 'first' for Yukon and extends the known range of this Cordilleran species by more than 1,000 miles. MAP 74.

Braya humilis (C.A. Mey.) Robinson

Alsek Valley Rd., 8 miles west of Mackintosh, in open places, No. 756; dry south-facing slope above Vulcan Creek south of Kluane Lake, No. 8217. In Yukon previously reported from Kluane Lake, Yukon, and the valleys of the River and its tributaries (Porsild, 1951). MAP 75.

Cardamine pennsylvanica Muhl.

In a dry slough near Johnsons Crossing, Porsild, No. 18410. In Yukon previously reported from Sheldon Lake on the Canol Rd. (Porsild, 1951).

Cardamine umbellata Greene

Seepy area on Mt. Archibald, No. 7790; wet, alpine tundra above Vulcan Creek south of Kluane Lake, No. 8217. McQuesten Area, Little South Klondike on north-facing cliff, elev. 4,600 ft., J. D. Campbell, No. 756. In Yukon otherwise known from a number of stations in the Pelly Mts. (Porsild, 1951). MAP 76.

Descurainia sophioides (Fisch.) O.E. Schulz

Dry roadsides near Mackintosh, No. 7468. Kluane Lake, Silver City Spetzman, No. 1962-186. A native wide-ranging Amphi-Beringian subarctic species which, in subalpine situations in the Northwest, apparently tends to become weedy, spreading freely along roads in freshly disturbed soils. In Yukon otherwise known from the Arctic Coast and from the Yukon Valley (Porsild, 1951).

Draba aurea M. Vahl

Vicinity of Mackintosh, in open places, No. 7659; damp depressions between Bear Creek and Pine Creek, No. 7621; Haines Rd., near Dezadeash Lake, A.E. & R.T. Porsild, No. 22306. All are rather typical *D. aurea* with bright yellow flowers and prominent styles about 1 mm long. In 1951, and again in 1960, the writer noted in SW. Yukon along the Alaska Highway a *Draba* of weedy habit, apparently closely related to *D. aurea*, which was common on disturbed soil along the highway. It differs from *D. aurea* in that it has white petals and

shorter styles and is biennial. Its flowering axes are less leafy than in typical *D. aurea*, and in this character it approaches *D. praealta*. It fruits abundantly and thus is easily spread by road equipment and may, indeed, be a recent introduction which now appears well established (*see also* Porsild, 1951, p. 34-35). This *Draba* is represented by several numbers in the Crum and Schofield collection, all collected near the highway and recorded as 'roadside weeds.' Between Bear Creek and Pine Creek, Nos. 7622 and 7648; vicinity of Mackintosh, Nos. 7660 and 7731. MAP 77.

Draba cinerea Adams

Dry grassy places near Mackintosh, No. 7319; alpine shale scree on Mt. Archibald, Nos. 7880 and 7942; gravel scree on alpine slope between Mt. Decoeli and unnamed mountain to the south, No. 8153; dry, rocky tundra above Vulcan Creek south of Kluane Lake, No. 8231; Slims R. near Sheep Creek, elev. 4,800 ft., Spetzman, No. 1962-196. An arctic species which in the interior of Yukon has been reported from the Pelly R. and Mt. Sheldon; perhaps always rare and mainly restricted to alpine situations (Porsild, 1951). No. 7319, growing in a lowland situation, had matured fruits on June 29.

Draba crassifolia Grah.

Alpine snowflushes and on damp shale screes on Mt. Archibald, Nos. 7885 and 7943. In Yukon previously reported from the Pelly Mts., Mayo, and Haines Rd. (Porsild, 1951).

Draba incerta Payson

D. oligosperma sensu Hultén, Fl. Al. and Yukon (1944), p. 863, not Hook., at least in part.

Alpine slopes among rocks, 4 miles up the Dezadeash valley, No. 7398; dry, alpine slopes of Mt. Archibald, Nos. 7845, 7873, 7874, and 7945; alpine slopes of Mt. Decoeli, elev. 4,000 ft., No. 8083. A Cordilleran species not previously reported from Yukon but known from Chitina R. in SW. Alaska (Porsild, 1939) and from the Mackenzie District (Porsild, 1943). MAP 78.

Draba lactea Adams

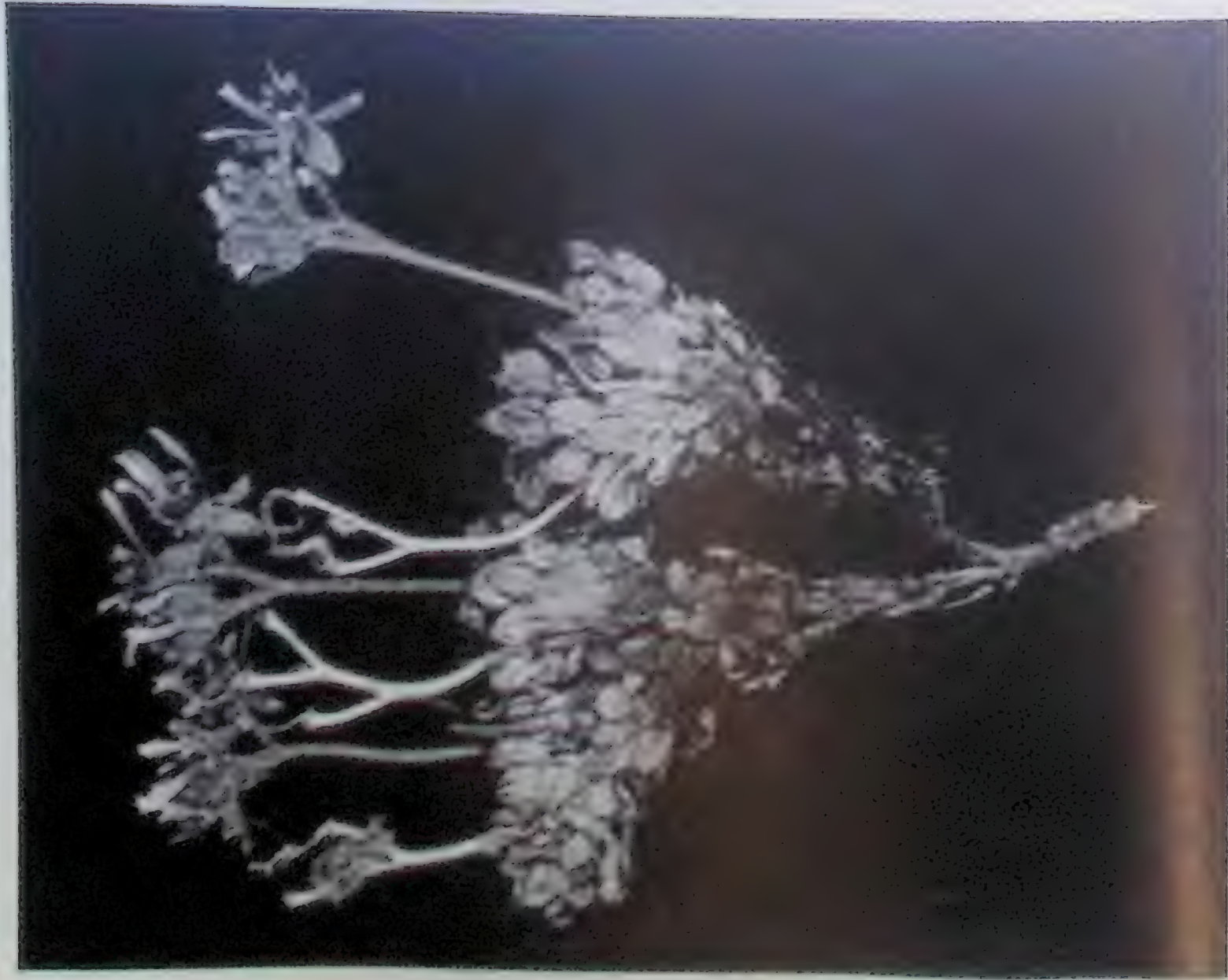
Alpine slopes between Mt. Decoeli and unnamed mountain to the south, No. 8137; damp alpine tundra above Vulcan Creek south of Kluane Lake, elev. 5,500 ft., Nos. 8220-1. In Yukon otherwise known mainly from alpine situations in the Pelly Mts. (Porsild, 1951).

Draba longipes Raup

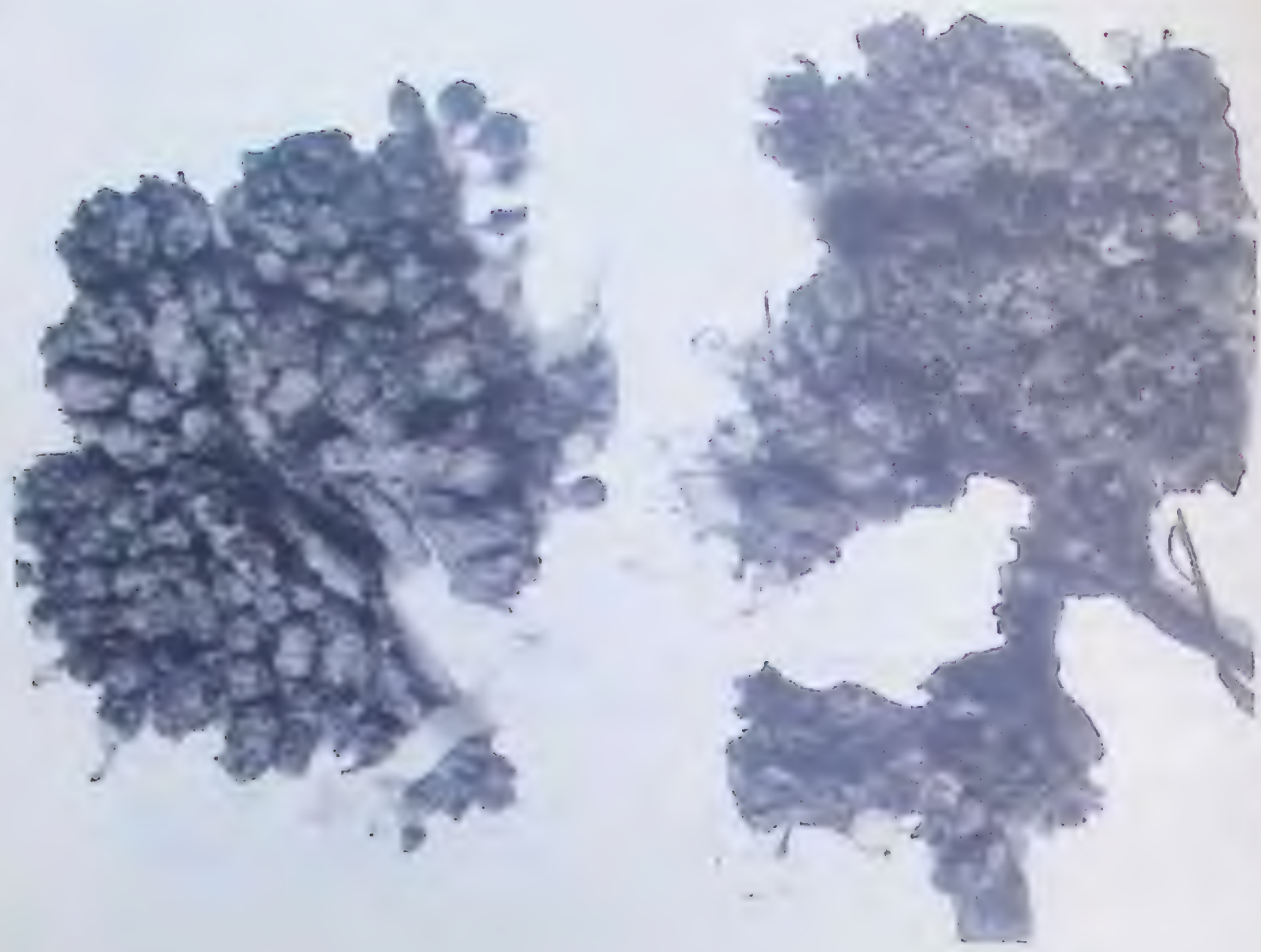
Alpine slopes of Mt. Decoeli, No. 8060. In Yukon otherwise reported only from alpine areas along the Canol Rd. (Porsild, 1951) but probably common on high mountains throughout the territory.

Draba nivalis Liljebl.

Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-194; alpine slopes of Mt. Archibald, Nos. 7877, 7884, and 7952; alpine slopes near Mile 100 on Haines Rd., No. 8292; dry tundra on alpine slope above Vulcan Creek south of Kluane Lake, elev. 6,000 ft., No. 8222. An arctic-alpine species in Yukon previously reported from mountains of central and eastern parts.



A. *Draba stenopetala* Trautv.
St. Lawrence Island, Alaska. Boxer Bay, June 22, 1960.
Franz Bauer (C.A.B. 704112)



B. *Draba stenopetala* Trautv.
Mt. Decodli, SW. Yukon, elev. 5,000 ft., Aug. 2, 1957.
Franz Bauer (C.A.B. 704111)

***Draba oligosperma* Hook.**

Open, gravelly places near Mackintosh, No. 7613; fruiting specimens on June 29, 4 miles up Dezadeash valley from Mackintosh, No. 7389; alpine slopes of Mt. Archibald, elev. 4,000 ft., flowering on July 20, No. 7944; Slims R. near Sheep Creek, alpine tundra on limestone, elev. 4,800 ft., flowering on June 26, Spetzman, No. 1962-197.

In Yukon previously collected only a few times and mainly on calcareous screes (Porsild, 1951). MAP 79.

***Draba Palanderiana* Kjellm.**

Damp alpine slopes between Mt. Decoeli and unnamed mountain to the south, elev. 5,100 ft., fruiting specimens on Aug. 2, Nos. 8102 and 8139; Koidern Mt., alpine tundra, elev. 4,300 ft., Spetzman, No. 1962-191. Although not previously reported from Yukon, two other collections are in the National Herbarium: Dawson Range, lat. 62° 35' N, and long. 138° 20' W, elev. 5,000 ft., H. Bostock, No. 252, and Herschel Island, O. Stringer, (CAN) 14254. Reported also from Richardson Mts. west of the Mackenzie Delta (Porsild, 1943, p. 42). Hultén (1945) follows Ekman (1931) in taking up *D. caesia* Adams for our plant. I have not seen the 'old authentic' specimen of *D. caesia* Adams on the strength of which El. Ekman reduced *D. Palanderiana* to synonymy. Schulz (1927), Fl. USSR (1939), and also El. Ekman considered *D. caesia* of hybrid origin. I entirely agree with Hultén that *D. Palanderiana* is not a hybrid but prefer to maintain it as distinct. MAP 80.

***Draba praealta* Greene**

Vicinity of Mackintosh, No. 7342; between Bear Creek and Pine Creek, No. 7647; Bear Creek, dry gravel terraces, Spetzman, No. 1962-192. Although the two first-mentioned collections were reported by the collectors as a 'roadside weed,' all are a perfect match for typical *D. praealta* as known to the writer from mountains of southern Alberta. A Cordilleran species of weedy habit in Yukon previously reported from the Yukon R. Valley and the Pelly Mts. (Porsild, 1951), where it undoubtedly is indigenous. MAP 81.

***Draba sibirica* (Pall.) Thell**

In N. America first reported from Ogilvie Mts. NE. of Dawson (Porsild, 1964b). Additional and better material was collected again in 1964 by Youngman & Tessier, Nos. 484-5.

***Draba stenoloba* Ledeb.**

Dry, open places near Mile 1037, elev. 3,000 ft., Nos. 7722 and 7773; alpine slopes of Mt. Archibald, elev. 4,000 ft., No. 7946; Mile 100 on Haines Rd., on dry tundra slope, No. 8282. In Yukon collected a few times in the Pelly Mts. (Porsild, 1951). MAP 82.

***Draba stenopetala* Trautv.** in Fl. Terrae Tschuktsch. in Acta Hort. Petrop. vi, 1: 11 (1879); Busch, in Fl. Sib. et Orient, Extr. 3: 305 (1913) and fig. on p. 305; Schulz in Pflanzenr. 89: 96 (1927).

D. densifolia El. Ekm. in Porsild, in Rhodora 41: 235 (1939); Hultén, Fl. Al. and Yukon, p. 851 (1945); Polunin, Circumpolar Arctic Fl., p. 234 (1959); O. Gjaerevoll, Kgl. Norske Vidensk. Skr. 1963, 4: 47, fig. 10, not Nutt.



A. *Draba densifolia* Nutt. x 1/1
Mountain north of Coleman east of Crowsnest Pass, Alberta,
July 6, 1956. Porsild and Lid, No. 19366 CAN.



B. *Saxifraga caespitosa* L. ssp. *monticola* (Small) Porsild n. comb. x 1 1/4
Banff National Park, Alberta. Quartz Ridge south of Healy Creek, Aug. 4, 1945.
Porsild and Breitung, No. 13852 CAN.

Mile 100 on Haines Rd., dry shoulder of mountain, elev. 5,800 ft., No. 8301; alpine slopes of Mt. Decoeli and unnamed mountain to the south, elev. 5,000 ft., No. 8151; both with fully mature fruits on Aug. 2 and 14 respectively (Plate V, B); Mt. Bratnobar, alpine tundra, elev. 5,000 ft., flowering specimens on July 9. Spetzman, No. 1962-195.

Densely tufted or pulvinate dwarf species with numerous densely congested branches from a weak tap-root; leaves densely imbricated, long marcescent, somewhat curved, linear or linear-lanceolate, about 4 mm long and 0.4 to 0.5 mm wide, not keeled but with a rather prominent midrib, conspicuously long-ciliate with simple and somewhat curved hairs, but otherwise glabrous. Scapes covered by densely tangled simple and variously forked hairs, and are sometimes so short that the 1- to 3-flowered racemes barely emerge above the plant cushion and, even in the fruiting state, may be no more than 1 to 2 cm long. Flowers small; sepals pubescent with simple or variously branched hairs, not much shorter than the pale to bright yellow, or even pinkish, linear or narrowly spatulate, 3 mm long and 0.5-1.0 mm wide and prominently clawed petals; siliques orbicular or ovoid glabrous, or short-pubescent, about 3 mm in diameter, with a short but thick 0.4-0.5 mm long style; seeds coal black, 1 to 1.4 mm long and 0.7 to 0.8 mm wide, commonly 2 or 3 in each compartment.

The Yukon specimens have glabrous siliques and are a perfect match for recent collections from St. Lawrence Island, Boxer Bay, June 22, 1960, F. Sauer (Pl. V A) and from Chukotsk Peninsula in Eastern Siberia: Gabinskya Mts., flowering on June 27, 1957, the last collected by V. Gavriluk and distributed by Herb. Inst. Bot. Acad. SSSR (CAN 265672 and 274134). The Siberian plant is well illustrated by N. Busch (loc. cit.).

In 1926, the writer collected a dwarf *Draba* on hills back of Norton Sd., and in Broad Pass in the Alaska Range (Porsild, Nos. 61 and 1155). El. Ekman (Sv. Bot. Tidsk. 1931, p. 487) named the first *D. stenopetala* and the second *D. densifolia* but (loc. cit., 1939) concluded that *D. stenopetala* was a synonym of *D. densifolia*, and therefore referred both collections to the latter species. My two numbers differ from the Yukon and Chukotsk plants by having, besides long-ciliate leaf-margins, a few branched hairs on both leaf surfaces and sparsely pubescent siliques and slightly longer styles. A collection from Lion Peak in the White Mts. of central Alaska, O. Gjaerevoll, No. 433, distributed as *D. densifolia*, and one, cited as *D. Bellii* (Porsild, 1945), from Mackenzie Mts., Bolstead Creek on the Canol Rd., Mackenzie Dist., Wynne-Edwards, No. 8314, likewise have sparsely pubescent siliques.

A comparison of the now abundant and well-authenticated material of *D. densifolia* from central Rocky Mountains (Pl. VI A) with the recent and ample collections of flowering and fruiting *D. stenopetala* from E. Asia and NW. America convinces me that the two taxa are abundantly distinct, as clearly indicated by the excellent descriptions given by Schulz (loc. cit., p. 96 and 102) and from Hitchcock's (1941) discussion and illustrations of *D. densifolia* and related Rocky Mountain species. From *D. globosa* and *D. sphaerulea* of Payson, by Hitchcock considered merely edaphic forms of *D. densifolia*, *D. stenopetala* differs by its always few-flowered inflorescence, narrow petals and orbicular, and more or less glabrous siliques. Another dwarf and pulvinate yellow-flowered *Draba*, which superficially resembles *D. globosa* and *D. stenopetala* and is known to extend from mountains of Wyo. and Wash. into southern B.C. and Alta.,

clearly is *D. Paysonii* Macbride var. *Treleasii* (Schulz) Maguire. It differs from *D. stenopetala* by having densely tangled simple and forked hairs on its leaves and lanceolate and always pubescent siliques.

There is ample phytogeographic support as well for considering *D. stenopetala* Trautv. distinct from *D. densifolia* Nutt., whose range, as known to Hitchcock in 1941, extended from the "higher mountains from western Wyoming, Utah, Nevada, and California northward to near the Canadian border. During seven seasons of intense collecting in alpine parts of the Canadian Rockies I have collected *D. densifolia* but once, in southern Alberta just north of Coleman near the east end of Crowsnest Pass (Porsild & Lid, No. 19366, Plate VI A), which, thus far, appears to be the northern limit of the species. The range of *D. stenopetala* Trautv., long known only from two stations in Chukotka Peninsula in easternmost Siberia, has now been extended to Alaska, Yukon, and the Mackenzie Mts. of N.W.T., where it appears to be restricted to unglaciated high-alpine stations. MAP 83. (Plate V A and B).

Erysimum cheiranthoides L.

In grassy places near Lapierre House, approx. lat. 66° 40' N, Youngman and Tessier, No. 618. In Yukon not reported from north of Dawson City but known in the Mackenzie valley north nearly to the Mackenzie Delta.

Erysimum Pallasii (Pursh) Fern.

Alpine shale screes on Mt. Archibald, elev. 4,000 ft., Nos. 7846 and 7909, with mature fruits on July 20; dry, alpine ridge, elev. 6,000 ft. above Vulcan Creek south of Kluane Lake, No. 8237; Slims River, alpine tundra, elev. 4,500 ft., Spetzman, No. 1962-185. An arctic species in Yukon otherwise known only from the Arctic Coast (Porsild, 1951) but reported from Keele R. in the Mackenzie Mts., N.W.T. (Raup, 1947).

Eutrema Edwardsii R.Br.

Damp alpine slopes of Mt. Decoeli, elev. 4,300 ft., No. 8072; mossy, north-facing slopes above Vulcan Creek south of Kluane Lake, elev. 6,000 ft., No. 8195; Quill Creek (Löve, 1956).

An arctic species, in Yukon otherwise known from the Arctic Coast and from high mountains along the Alaska-Yukon boundary (Porsild, 1951). The present collection extends the southern limit for *Eutrema* in Yukon by about 200 miles.

Halimolobos mollis (Hook.) Rollins, in *Rhodora*, 43: 480 (1941); *Arabis Hookeri* Lge., based on *Turritis mollis* Hook.; Porsild in *Sargentia* 4: 43 (1943).

Vicinity of Mackintosh in dry, gravelly places, No. 7324A. The present collection, which consists of four fruiting plants each with from 1 to 4 simple, unbranched fruiting axes, at first glance bears a superficial resemblance to *Arabis Nuttallii*.¹ The obscurely sinous-dentate basal leaves, the sessile auriculate cauline leaves, and the incumbent cotyledons present in No. 7324A, however, are definitely those of *Halimolobos mollis*, as subsequently confirmed by specimens grown at the Central Experimental Farm, Ottawa, from seed obtained from No. 7324A. In Yukon *Halimolobos mollis* is otherwise known from several stations

¹An earlier report of that species from Whitehorse, based on two imperfect flowering stems (Porsild, 1951), is problematic.

in the Yukon valley and from Pelly R. *Halimolobos mollis* tends to be anthropochorous; its tiny seeds become strongly mucilaginous when wet and are thus well adapted to accidental dispersal by man or animals (Porsild, loc. cit.).

***Lesquerella arctica* (Richards.) Wats. ssp. *Purshii* (Wats.) Porsild**

Dry, gravelly places along road 4 miles up Dezadeash Valley from Mackintosh, No. 7351. Bear Creek, gravelly terraces, elev. 2,100 ft., Spetzman, No. 1962-176; Slims R., alpine limestone tundra, elev. 4,800 ft., *idem*, No. 1962-177. In Yukon otherwise known from the Pelly Range and the Porcupine Plateau. (For a discussion of *L. arctica* and its ssp. *Purshii* see Porsild, 1951, p. 191-2.)

***Rorippa barbareaefolia* (DC.) Kitagawa**

McQuesten Area, main forks of Clear Creek, in silt bed on old placer tailings, J. D. Campbell, No. 823. As noted by Porsild (1939), *R. barbareaefolia*, although undoubtedly indigenous in Alaska and Yukon, is commonly found near placer mining camps where it pioneers on freshly exposed soil such as mine-tailings and dumps. In Yukon the species is known only from the placer mining area of the central plateau. MAP 84.

***Thlaspi arcticum* Porsild in Sargentia 4:40 (1943).**

Small open patch on ancient boulder slope above Vulcan Creek south of Kluane Lake, elev. 5,600 ft., No. 8253. The collection represents a notable extension of the range of this rare endemic species otherwise known only from the type locality on the arctic coast of Yukon, and from adjacent parts of Alaska. MAP 86.

***Smelowskia borealis* (Greene) Drury & Rollins, Rhodora 54:85-118 (1952).**

Flowering specimens collected on June 27 were reported by Löve (1958) from upper Quill Creek. MAP 85.

***Ribes triste* Pall.**

Junction of White and Koidern rivers, Spetzman, No. 1962-223.

***Saxifraga adscendens* L. ssp. *oregonensis* (Raf.) Bacigalupi**

Mt. Archibald on wet mud by creek, elev. 4,500 ft., No. 7828. Fruiting specimens on July 17. In Yukon otherwise known from a few collections in the Pelly Mts. (Porsild, 1951). MAP 87.

***Saxifraga bronchialis* L. ssp. *Funstonii* (Small) Hult.**

Mile 100 on Haines Rd., alpine slopes, No. 8289; alpine scree slopes on Mt. Archibald, elev. 4,000 ft., Nos. 7854 and 7926; alpine slopes between Mt. Decoeli and unnamed mountain to the south of it, elev. 4,600 ft., No. 8130; Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-207; Koidern Mt., alpine tundra, elev. 4,300 ft., *idem*, No. 1962-209. An Amphi-Beringian race barely entering southwestern Yukon where it has been collected a few times (Porsild, 1951).

***Saxifraga caespitosa* L. ssp. *monticola* (Small) Porsild, n. comb. Plate VI B
Muscaria monticola Small, N. Am. Fl. 22, 2:130 (1905).**

Saxifraga exarata Hook., Fl. Bor.-Am. 1: 244 (1833), not Vill.

S. groenlandica L. ssp. *exaratoides* Simm., Fl. Ellesmereland, 1906, p. 73, in part, not as to type.

S. caespitosa L. ssp. *exaratoides* (Simm.) Engl. & Irmsch. var. *Drummondii*

Engl. & Irmsch. Pflanzenr. IV, 117,2: 375 (1917), in part: excl. syn.

Muscaria caespitosa sensu Small, loc. cit. as regards Rocky Mountain plants is not *S. caespitosa* L.

Alpine slopes of Mt. Archibald, elev. 4,000 ft., No. 7927; alpine slope between Mt. Decoeli and mountain south of it, elev. 4,800 ft., No. 8131, flowers and fruiting on August 2; Mt. Bratnober in alpine tundra, elev. 5,000 ft., S. P. S. man, No. 1962-220.

The writer (Porsild, 1951) reported *S. caespitosa*, a very rare plant in Yukon and, mainly on phytogeographic grounds, tentatively referred two scrappy collections obtained by him in the Pelly Mts. to the Amphi-Beringian race, *S. sileneflora*. The fine material collected by Crum and Schofield shows that the Yukon plant and an earlier collection from the Richardson Mountains west of the Mackenzie Delta (Porsild, No. 6831) belong to the Cordilleran race, *S. monticola*, the type of which came from Tunnel Mt., Banff National Park (W. L. McCalla, No. 2288, NY).

S. caespitosa ssp. *monticola* is one of several well-marked Cordilleran races of *S. caespitosa*. In common with a number of other Cordilleran plants, it is wide-ranging along the central and eastern ranges of the Rocky Mountain system, from Utah north to southern British Columbia and Alberta. North of latitude 53° it is known thus far only from widely disjunct stations in northeastern B.C., from the Richardson Mountains east of the Mackenzie Delta, and from mountains of interior Yukon. Hooker (loc. cit.) mistook specimens collected by Drummond in the Canadian Rocky Mts. for *S. exarata* Vill. of central Europe and Simmons (loc. cit.) thought the Rocky Mt. plant identical with one discovered by him on Ellesmere Island, as did Engler & Irmscher (loc. cit.). The latter plant, *S. caespitosa* ssp. *exaratooides* (Simm.) Engl. & Irmsch., illustrated in Simmons (loc. cit.) tab. 7, figs. 1-3, apparently is endemic to the eastern Canadian Arctic where it is of local occurrence, from the Foxe basin north to southern Ellesmere Island, but thus far it has not been reported from the western islands of the Canadian Arctic Archipelago (Porsild, 1951). A comparison between ssp. *monticola* and ssp. *exaratooides* shows that the affinity of the latter is with other eastern races of *S. caespitosa*: *S. caespitosa* L. ssp. *decipiens* (Ehrh.) Engl. & Irmsch.; *S. groenlandica* L. MAP 88.

Saxifraga davurica Willd. ssp. *grandipetala* (Engler & Irmsch.) Hult.

Alpine slopes in moist places by streamlet near Mile 100 on Haines Rd., elev. 5,300 ft., No. 8239; Ogilvie Mts. south of Chapman Lake, $64^{\circ} 35' N$, $138^{\circ} 20' W$, Youngman and Tessier, No. 478.

Although not previously reported from east of the Alaska-Yukon boundary, some earlier collections from Yukon and the Mackenzie Mts., N.W.T., reported by the writer (Porsild, 1945 and 1951) as *S. Lyallii* should be referred to *S. davurica* ssp. *grandipetala*. These are: Kluane Lake, Burwash Landing, C.H.D. Clarke, No. 247; Dawson Range, lat. $62^{\circ} 35'$, long. $138^{\circ} 20'$, H. Bostock, No. 261; Mayo District, elev. 4,700 ft., lat. $63^{\circ} 46'$, long. $134^{\circ} 20'$, H. Bostock, No. 75; mountains north of McQuesten R., elev. 5,700 ft., R. L. Christie, Nos. 52 and 53; Mackenzie Mts., N.W.T., Canol Rd. near head of Bolstead Creek, elev. 5,000-7,000 ft., Wynne-Edwards, Nos. 8325-27. MAP 89.

Saxifraga flagellaris Willd. ssp. *flagellaris*

Alpine slopes of Mt. Decoeli, elev. 4,500 ft., No. 8088; moist tundra slope

above Vulcan Creek south of Kluane Lake, elev. 6,000 ft., No. 8232. In Yukon previously reported from Dawson Range and Black R., both in SW. Yukon (Porsild, 1951 and 1954).

***Saxifraga foliolosa* R. Br.**

Haines Rd., Mile 100, on wet margin of streamlet, elev. 5,300 ft., No. 8302. An arctic species not previously reported from Yukon.

***Saxifraga Hirculus* L.**

Mossy, alpine slopes of Mt. Decoeli, elev. 4,500 ft., No. 8057; damp alpine tundra above Vulcan Creek south of Kluane Lake, No. 8243. Both collections belong in the large-flowered Amphi-Beringian race, var. *typica*, in Yukon previously known from Kluane Lake and from the Arctic Coast (Porsild, 1951).

***Saxifraga Lyallii* Engler**

Wet mossy slope near Mackintosh, No. 7702. A Cordilleran species, in Yukon otherwise known from the Pelly Mts. and from Haines Rd. (Porsild, 1951). (See also note under *S. davurica* ssp. *grandipetala*). The Yukon population of *S. Lyallii* by Calder and Savile (1960) has been referred to var. *Hulténii* Calder and Savile, said to differ from var. *typica* by taller growth and by having flabellate rather than spatulate leaves. The writer is unable to detect any consistent differences between *S. Lyallii* from Yukon and southern Canadian Rocky Mountains, where, furthermore, plants with flabellate or spatulate leaves may be found in the same population and where, according to Calder and Savile, typical *S. Lyallii* and the var. *Hulténii* grow side by side. MAP 90.

***Saxifraga nivalis* L.**

Mt. Bratnober, in alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-213. Apparently rare in Yukon where it has been reported a few times from mountains along the Canol Rd., from Ladue River (Porsild, 1951), and from Frances River (Hult. 1945).

***Saxifraga punctata* L. ssp. *insularis* Hult.**

S. punctata L. ssp. *Porsildii* Calder & Savile, Can. J. Bot. 38, p. 429 (1960).

Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-202. Apparently the predominant race of *S. punctata* in the southern parts of the Territory. For a discussion of the races of *S. punctata* in Yukon, see Porsild, 1951, p. 208-9, and for a revision of the N. American race of *S. punctata*, see Calder & Savile (loc. cit.), where ssp. *insularis* Hult. is restricted to the Aleutian Islands plant and ssp. *Porsildii* is proposed for the widely disjunct but morphologically very similar race inhabiting northern B.C., southern and central Yukon east through Mackenzie District to western Keewatin.

***Saxifraga punctata* L. ssp. *pacifica* Hult.**

Haines Rd., Mile 10, shaded, among alders, elev. 3,800 ft., tall, fruiting specimens on August 14, No. 8295; alpine shale scree on Mt. Archibald, No. 7851. The present collection extends the known range of ssp. *pacifica* to SW. Yukon.

***Saxifraga serphyllifolia* Pursh**

Haines Rd., Mile 100, on alpine banks, No. 8303; Quill Creek acc. to D. Löve (1956); Ogilvie Mts., Chapman Lake, lat. 64° 35' N, long. 138° 20' W, Youngman and Tessier, No. 477.

In Yukon otherwise known from Donjek R. in SW. Yukon, and from Dawson area. MAP 91.

Saxifraga tenuis (Wahlenb.) H. Sm.

Mt. Archibald, damp alpine turf at top of shale scree, No. 7882. In Yukon reported previously from the Pelly and Dawson ranges, but not from SW Yukon.

Dryas alaskensis Porsild

North side of Koidern Mt., alpine tundra, elev. 4,300 ft., Spetzman, No. 1962-229; west side of Kluane Lake, alpine tundra on granite, elev. 4,800 ft., *idem*, No. 1962-232. MAP 92.

Dryas crenulata Juz.

Alpine slopes of Mt. Archibald, No. 7792. In Yukon otherwise known from southeastern, central, and northern parts.

Dryas Hookeriana Juz.

Alpine slopes of Mt. Archibald, elev. 4,000 ft., No. 7915. The collection represents a notable extension of this Cordilleran species not otherwise reported north of latitude 54° in central British Columbia.

Dryas octopetala L.

Alpine scree slopes of Mt. Archibald, elev. 4,000 ft., No. 7925, Mt. Bratneber, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-234; west side of Kluane Lake, elev. 4,300 ft., alpine tundra, *idem*, No. 1962-230. In Yukon previously reported from Kluane Lake, Pelly Range, and the Arctic Coast (Porsild, 1951).

Geum aleppicum Jacq. var. *strictum* Ait.

Damp places among willows near Mackintosh, Nos. 7419, 7596, and 8002; damp alpine meadow along Alsek valley road 8 miles west of Mackintosh, No. 7545. New to the flora of Yukon. Its nearest known station is at Ft. Simpson on the Mackenzie R. MAP 93.

Geum Rossii (R. Br.) Ser.

McQuesten Area, left fork of Clear Creek, alpine slopes, elev. 5,500 ft., and Little S. Klondike on moist rocky ledges, elev. 6,100 ft., J. D. Campbell, Nos. 611 and 679. Ogilvie Mts., Chapman Lake, lat. 64° 35' N, long. 138° 20' W, Youngman and Tessier, No. 473. In Yukon otherwise known only from the Ogilvie Mts. and the eastern Selwyn Range.

An arctic-alpine species of most unusual range occupying three widely disjunct areas. The first and largest of these extends from Kamchatka over Anadyr to Chukotsk Peninsula, thence across Bering Strait and along the Aleutian Chain to mountainous parts of western Alaska, the Pacific coast area and the Alaska Range, skipping to the easternmost parts of Brooks Range and entering Yukon along the Ogilvie and eastern Selwyn ranges, but thus far not reported from the Mackenzie and Richardson mts. Its second and smallest area is in the northernmost islands of the Canadian Arctic Archipelago where it is known from half a dozen widely scattered stations from western Ellesmere over Axel Heiberg to Melville Island which latter is the type locality for *G. Rossii*. Its third, and also very large area, disjunct from the northern and northwestern populations by a gap of more than 1,200 miles, extends from Washington and Oregon south to

New Mexico and Arizona, east to Montana, Wyoming, and Colorado; here it has been known as *Geum* [*Acomastylis*] *turbinatum* Rydb. or *G. sericeum* Greene. Throughout this southern area *G. Rossii* is restricted to the high-alpine zone where, as indeed elsewhere throughout its range, the variations within this remarkable species are only those which can readily be attributed to habitat and exposure.

Although common locally, the range of *G. Rossii* is nowhere continuous within these three widely disjunct main areas, being apparently always restricted to soils derived from non-calcareous crystalline rocks.

***Potentilla arguta* Pursh ssp. *Convallaria* (Rydb.) Keck**

Vicinity of Mackintosh, roadside, Nos. 7471, 7522; near Sulphur Lake, No. 8036. In Yukon previously reported from Whitehorse and Haines Rd. Junction (Porsild, 1951). MAP 94.

***Potentilla biflora* Willd.**

Dogpack Lake, north of Kluane Lake, elev. 5,300 ft., on limestone flats. Spetzman, No. 1962-239; Ogilvie Mts., south of Chapman Lake, lat. 64° 35' N, long. 138° 20' W, Youngman and Tessier, No. 474. Joe Creek, lat. 68° 50' N, and long. 140° 33' W, *idem*, No. 133. The specimens are in prefloral state with densely hirsute young leaves. Previously reported from a single station in the Kluane Lake area (Porsild, 1951). MAP 95.

***Potentilla furcata* Porsild, Nat. Mus. Canada Bull. 121: 224, tab. 18, fig. 1-4 (1951).**

Common in prairies in vicinity of Mackintosh, No. 8009. In Yukon otherwise known from several stations in the Pelly Mts. (Type locality), Liard Hot-springs, B.C., and from the southern Canadian Rockies (Porsild, 1951 and 1961). MAP 96.

***Potentilla glabrella* Rydb.**

Dry gravelly area near Mackintosh, No. 7239; Slims R., alpine tundra, elev. 4,800 ft., Spetzman, No. 1962-247; Upper Beaver Creek, south of Bear Mt., elev. 3,100 ft., *idem*, No. 1962-238. A Cordilleran species in Yukon otherwise known from a few stations in the Pelly Mts. (Porsild, 1951). MAP 97.

***Potentilla hyparctica* Malte; *P. emarginata* Pursh, not Desf.**

Alpine slopes of Mt. Decoeli, No. 8084; Mt. Bratnober, elev. 5,000 ft., in alpine tundra, Spetzman, No. 1962-243. An arctic species in Yukon otherwise known from high mountains along the Canol Rd. and from the Mayo Dist. (Porsild, 1951, as *P. emarginata*).

***Potentilla multifida* L.**

Silver City, Kluane Lake, on gravelly lakeshore, Spetzman, No. 1962-245. Not previously reported from Yukon but collected a few times in the Alaska Range, Alaska. Several collections from the north slope (Spetzman, Nos. 1043 and 1490) in Wiggins' Flora (Wiggins, 1962) are reported as *P. virgulata* A. Nels. MAP 98.

***Sorbus scopulina* Greene**

Wooded subalpine slopes of Mt. Archibald, elev. 4,000 ft., Nos. 7814 and 7921; gravel beach up Alsek Valley toward Alsek Lake, No. 8317, with mature

fruits on August 18. Although only recently reported from Yukon (Percy 1951), *S. scopulina* probably is common in suitable places throughout south and central parts of the Territory. MAP 99.

Astragalus aboriginorum Richards.

Among other quite typical fruiting material in the collection (e.g., No. 732 from vicinity of Mackintosh) is a strikingly different specimen (No. 7693) which all but one of the legumes, apparently due to damage caused by smut, completely sessile within the calyx. One single legume, however, is not infected and shows the long stripe so characteristic for the *A. aboriginorum*. MAP 100.

Astragalus alpinus L.

Alpine slopes of Mt. Decoeli and unnamed mountain to the south, 4,800 ft., No. 8133. Among the several numbers of typical *A. alpinus* in the collection, No. 8133 differs rather markedly by its erect growth and by its dark green and branching flowering axes. Following Hultén (1947) this is his *alaskanus*, but among the dozen or so of Yukon and Alaska plants in the National Herbarium of Canada thus annotated by Hultén, only one, Macoun, No. 58432 CAN, from Hunker Creek near Dawson, looks quite like No. 8133 whereas the remainder show a continuous transition toward typical *A. alpinus*. In both numbers cited, the characters of the flowers and fruits, however, are those of typical *A. alpinus*.

Astragalus eucosmus Robins in Rhodora 10:33 (1909).

Phaca elegans β *minor* Hook. in Fl. Bor.-Am. 1: 144 (1830).

Atelophragma atratum Rydb., N. Am. Fl. 24: 372 (1929).

Astragalus eucosmus f. *minor* Rousseau, Contrib. Lab. Bot. Univ. Montreal 24:40 (1933).

Astragalus Sealei Lepage Nat. Canad. 85: 102 (1958).

Vicinity of Mackintosh, wet places in poplar woods, No. 7606. This is the typical lowland, boreal forest plant with narrow leaflets, greatly elongating fruiting racemes, and black legumes. In a very similar plant, also of the boreal forest region, the pubescence of the legumes is pale grey (f. *leucocarpus* Lepage, in Am. Midl. Nat. 46, 3:758 (1951)). This latter taxon is represented by two collections, also from the vicinity of Mackintosh, Nos. 7506 and 7991.

A fourth collection, from Dezadeash River valley, No. 7382, represents a slightly more striking variation of *A. eucosmus*, differing by its smaller and fewer flowers, resulting in a shorter fruiting raceme, and by shorter but relatively broad leaflets. This plant occurs across subarctic N. America, from southern Baffin Island to northwest Alaska, and in alpine situations in the Canadian Rockies, Yukon, and Alaska. Hooker recognized this variation in a Drummond collection from the Canadian Rocky Mountains, of which a photograph taken at Kew is now before me, and named it *Phaca elegans* β *minor* Hook. Rousseau (loc. cit.), when intending to make a formal transfer of this plant to *Astragalus eucosmus* f. *minor*, noted its smaller leaves and flowers and shorter inflorescence, but apparently did not realize that the β *minor* of Hooker was *Atelophragma atratum* Rydberg, based on dwarf specimens collected on Herschel Island, Y.T., by Alvin Seale, in 1896 (Holotype in Dudley Herb.). *Astragalus Sealei* Lepage, likewise based on Rydberg's type, has been taken up by Wiggins & Thomas (1962).

The writer (Porsild, 1957), when illustrating the arctic plant (fig. 50, b and c), considered the differences between it and the woodland plant too slight for formal nomenclatural recognition as did Ostenfeld (1910) when discussing specimens from Herschel Island brought back by the Gjøa Expedition.

Astragalus goniatus Nutt.; *A. agrestis* Hult. Fl. Al. and Yukon p. 1081 (1947)

Alaska Highway, Canyon, Mile 996, forming mats in meadow, elev. 2,200 ft., with last year's persisting pods, besides fully expanded flowers of the year, on June 4, 1960, Mrs. J. Lammers CAN.; Whitehorse, J. P. Anderson, No. 9583 CAN. The last number, as well as *A. Tarletonis* Rydb. from the type locality on the Yukon R., Five Finger Rapids, Tarleton, No. 78, by Hultén (loc. cit.), was referred to *A. agrestis* Dougl. The first two collections cited, at any rate, are indistinguishable from typical *A. goniatus* from Man., Sask., and Alta., and differ from *A. agrestis* by having black hairy calyces with teeth much shorter than the tube. MAP 101.

Astragalus linearis (Rydb.) Porsild

On dry silt banks on Mt. Archibald, elev. 4,000 ft., No. 7955; Burwash Landing, Kluane Lake, Spetzman, No. 1962-259. In Yukon reported from Whitehorse and from a single collection in SW. Yukon (Porsild, 1951). Perhaps doubtfully distinct from *A. aboriginorum* Richards. *sensu str.*

Astragalus nutzotinensis Rousseau

Floodplain gravel at foot of Mt. Archibald, No. 7791; same place, alpine shale scree, No. 7840; floodplain in Dezadeash River valley 4 miles from Mackintosh, No. 7386; gravelly tundra, Haines Rd., Mile 75, B.C., No. 8258.

The fine series supplies most welcome material of the rare and little collected species. No. 7386 shows flowers and young fruits on June 30, and No. 7791 both fully matured legumes and partly and fully opened flowers on July 17. In Yukon previously reported from St. Elias Range. As far as I know the last number represents a first record for British Columbia.

Astragalus striatus Nutt.

Open gravelly slope, 4 miles up Dezadeash valley from Mackintosh, No. 7397. In Yukon otherwise known from the upper Yukon and its tributaries (Porsild, 1951). MAP 102.

Astragalus tananaicus Hult. Fl. Al. and Yukon 10:1763 (1950); *A. viciifolius* Hult. not DC.

Roadsides between Bear Creek and Pine Creek, No. 7644; roadsides near Mackintosh, No. 8022; dry gravel slope near Bear Creek Summit, elev. 3,000 ft., No. 7893; Jacquot I., Kluane Lake, Spetzman, No. 1962-262; Champagne, *idem*, No. 1962-257. Fine flowering and fruiting material. In Yukon previously reported a few times from Kluane Lake area, and from the Pelly Mts., Whitehorse (Porsild, 1951). MAP 103.

Lupinus sericeus Pursh¹

Vicinity of Mackintosh, gravel bank near Summit Creek, No. 7974; gravelly areas 4 miles up Dezadeash Valley, No. 7365; Haines Rd., Mile 100, rocky slope, elev. 4,000 ft., No. 8296. The present series is tentatively referred to *L. sericeus*.

¹By D. B. Dunn (in herb., 1965) this series, together with other Yukon specimens of this complex, has been referred to *L. Kuschei* Eastw. Leaf. West. Bot. 3:170 (1942).

All were collected near the road and, like similar specimens reported from Whitehorse, Mackintosh, and Carcross, closely match *L. Jacob-Andersoni* C. P. Smith and *L. Porsildianus* C. P. Smith (Cf. also Porsild, 1951, and Hultén, 1951, p. 1759, on difficulty presented by the series of 'species' of *Lupinus* described from Alaska-Yukon by C. P. Smith).

Oxytropis glutinosa Porsild in Nat. Mus. Canada Bull. 121: 240 and tab. xxiv, fig. 2 (1951).

Alpine, rocky slopes of Mt. Archibald, Nos. 7827 and 7929; damp slope between Mt. Decoeli and unnamed mountain to the south, elev. 4,800 ft., No. 8135; floodplain of Silver Creek near Kluane Lake, Mile 1053, No. 777. Besides the type locality in the Pelly Range, *O. glutinosa* is known from mountains of northern Yukon, Kluane Lake, from the Alaska and Brooks ranges in Alaska, and from the western islands of the Canadian Arctic Archipelago (Porsild, 1955).

Oxytropis Huddelsonii Porsild in Nat. Mus. Canada Bull. 121: 242 and tab. xvii, fig. 5 (1951).

Damp, alpine slopes of Mt. Decoeli, elev. 4,100 ft., flowering specimen July 29, No. 8061; alpine tundra slopes between Mt. Decoeli and unnamed mountain to the south, elev. 4,800 ft., fruiting on August 2, No. 8148; alpine slopes of Mt. Archibald, elev. 4,000 ft., fruiting on July 20, No. 7935; dry alpine tundra, Mile 100, Haines Rd., elev. 5,800 ft., No. 8284. Reported from Quill Creek (D. Löve, 1956).

The type of *O. Huddelsonii* consisted of a single, fruiting specimen from Golden Horn Mt. south of Whitehorse. Among the excellent material contributed by Crum and Schofield are some with flowering peduncles with from 1 to 2 flowers and some with well-formed legumes up to 2.5 cm long. In well-developed flowers the calyx is densely black pubescent, 1.0 cm long with deltoid teeth about 3 mm long. The corollas are deep purple.

O. Huddelsonii has been collected also in central Alaska: White Mountain headwaters of Sheep Creek and Mascot Creek, O. Gjaerevoll, No. 180; Rainier Mt. on serpentine scree slopes, *idem*, No. 1202 (both numbers distributed as *O. pygmaea*). MAP 104.

Oxytropis Maydelliana Trautv. in Acta Hort. Petrop. 6 (1879)

Alpine tundra slopes of Mt. Decoeli, No. 8059A; Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-275; Quill Creek acc. to D. Löve (1956). In Yukon long known only from the Arctic Coast but in recent years reported from a few alpine inland stations: Mt. Sheldon in the Selwyn Range and near Kluane Lake in SW. Yukon (Porsild, 1951).

Although described from Chukotsk Pen. in eastern Siberia and found also in Kamchatka, the main range of *O. Maydelliana* is in arctic and subarctic North America, where it extends from Baffin Island and northern Labrador-Ungava west to Bering Strait, south approximately to the treeline (see map fig. 24; Porsild, 1957).

Throughout its eastern Canadian range westward to the Mackenzie Valley *O. Maydelliana* is rather uniform, agreeing very closely with the description given by Fernald (1928) and with the photograph reproduced by Ostenfeldt (1910, tab. 2, fig. 2). West of the Mackenzie Mountains and westward through Yukon and Alaska, *O. Maydelliana* becomes taller and more robust in

parts, with its scapes as well as the bracts of the inflorescence, calyces, and immature legumes all markedly shaggy from up to 5 mm long pale hairs that often completely conceal the short and dense black pubescence underneath, as seen in a collection from Mt. Fairplay, lat. $63^{\circ} 40'$ and long. $142^{\circ} 20'$ in central Alaska, E. Scamman, No. 6260 CAN, in which all parts of the fruiting axes are covered by shaggy hairs 3–5 mm long. Ostenfeld (loc. cit.), under *O. campestris* var. *melanocephala*, noted that specimens from King Point on the arctic coast west of the Mackenzie Delta “differ from the King William Land plant in the covering of the scapes and of the calyx being to a less degree dark-pubescent and to a higher degree white-villous”; the King Point plants are said to be “higher and better developed, but agree in all other characters with the other specimens of var. *melanocephala*, which I have seen.”

Trautvetter's description of *O. Maydelliana*, excellent in so far as it goes, is based on a single collection in the flowering state, from Anadyr R. on the south coast of Chukotsk Peninsula in Eastern Siberia. It perfectly matches specimens in the National Herbarium of Canada, from near the type locality, which again closely agrees with specimens from northern Alaska and Yukon.

It appears then that there is ample ground for reserving *O. Maydelliana* Trautv. s. str. for the Amphi-Beringian plant. For the eastern plant, here considered a geographic race, the first available name is *O. Maydelliana* Trautv. ssp. *melanocephala* (Hook.) n. comb., based on *O. campestris* (L.) DC. var. *melanocephala* Hook. in Fl. Bor.-Am. 1:147 (1834), from “Bear Lake to the Arctic shores and Islands.” Holmen (1962) reports $2n=96$ chromosomes in *O. Maydelliana* from the north slope of Brooks Range, Alaska. I know of no published chromosome count for the eastern N. American race. MAP 105.

Oxytropis pygmaea (Pall.) Fern.

West side of Kluane Lake, on granite cliff in alpine tundra, elev. 4,800 ft., Spetzman, No. 1962-267; Koidern Mt., alpine tundra, elev. 4,300 ft., *idem*, No. 1962-268. In Yukon otherwise known from the Pelly Range (Porsild, 1951) and from mountains of the central plateau (Hultén, 1947). MAP 106.

Oxytropis Scammaniana Hult.

Dry, alpine slopes along Haines Rd., Mile 100, No. 8267; alpine tundra slopes of Mt. Decoli, No. 8059; Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-266. In Yukon otherwise known only from Kluane Lake (Porsild, 1951) but apparently common in mountains of central Alaska, and undoubtedly occurring also in the Ogilvie and Selwyn mountains of central Yukon. In the Kew Herbarium is an unnamed specimen of *O. Scammaniana* collected in 1891 at Juneau, Alaska, by Cooley (1892, p. 240), although the only *Oxytropis* listed by her are *O. Lamberti* and *O. campestris*. MAP 107.

Oxytropis spicata (Hook.) Standl.

Carcross, on sand dune along Lake Bennett, fruiting specimens with second flowers of season on Aug. 25, Porsild, Nos. 18505–6; Kluane Lake, Burwash Landing, flowering on June 26, Spetzman, No. 1962-274; Kluane Lake, Jacquot I., *idem*, No. 1962-269. A Cordilleran foothill species recently reported north to Liard Hotsprings and SW. Mackenzie Dist. (Porsild, 1961). The present collections extend the range of this species to Yukon. MAP 108.

Oxytropis varians (Rydb.) Hult.

Damp slope between Mt. Decoeli and unnamed mountain south of it, elev. ca. 4,800 ft., No. 8134; alpine slopes of Mt. Archibald, elev. ca. 4,000 ft., No. 7934; vicinity of Mackintosh, roadsides, No. 7681.

The first number cited is remarkable in that all leaflets are arranged in verticils of 4, whereas in No. 7934 most are paired and only very few are in 3's. In the last number all leaflets are paired; the stipules are densely shaggy from long white hairs as in typical *O. varians* (Cf. also Barnaby (1952)). MAP 109.

Oxytropis viscidula (Rydb.) Tidestr. ssp. *sulphurea* Porsild in Nat. Mus. Canada Bull. 121: 247 (1951)

Alpine slopes of Mt. Archibald, elev. 4,000 ft., flowers white (in life) dry yellowish, with a purplish spot on the keel, No. 7930. The type locality of *sulphurea* is on Rose River in the Pelly Mts. where it is common on dry, sunny slopes. The ssp. *sulphurea* is known also from Kluane Lake, Silver City, Spentman, No. 1962-271, and Burwash Landing, *idem*, No. 1962-273; Quill Creek acc. to D. Löve (1956), and from several stations in central Alaska. MAP 110.

Geranium erianthum DC.

Haines Rd., Mile 100, in open meadow and birch thickets, No. 8276. Pacific coast species which barely enters Yukon (Porsild, 1951).

Callitriche verna L.

McQuesten Area, Little S. Klondike Valley, in a muskeg pond, J. D. Campbell, No. 742; Bell River, 11 miles NE. of Lapierre House, with well formed fruits on July 29, Youngman and Tessier, No. 622. The last station probably represents the northern limit of the species in North America. In Yukon previously reported from the Whitehorse and Dawson districts, and from Sheldon Lake on the upper Canol Rd. (Porsild, 1951).

Epilobium anagallidifolium Lam.

Swampy areas southwest of Mackintosh, No. 7980. In Yukon otherwise reported only from a few stations along the Canol Rd. (Porsild, 1951).

Epilobium leptophyllum Raf.

Vicinity of Mackintosh, in damp areas and spruce bogs, Nos. 7478 and 7680. The collection is the first from Yukon and represents a notable extension of the known range of this wide-ranging eastern species in the Northwest only recently reported from Liard Hotsprings in northern B.C. (Porsild, 1961) MAP 111.

Myriophyllum exalbescens Fern.

In a small pond on Mt. Archibald, elev. 4,000 ft., sterile specimens on July 20, No. 7958; vicinity of Mackintosh, in Sulphur Lake, flowering specimens on July 28, No. 8040. In Yukon otherwise reported only from the southeastern parts (Porsild, 1951).

Coelopleurum Gmelini (DC.) Ledeb.

Haines Rd. in alder thickets near Mile 100, No. 8270. The collection is the second for Yukon where the species is otherwise reported from the Selkirk Range (Porsild, 1951).

Contrary to Fernald (1921, p. 146), Mathias & Constance (1945, p. 194) considered *C. Gmelini* (DC.) Ledeb. identical with the eastern *C. lucida* L. The bicentric distribution thus postulated, on phytogeographical grounds alone would be unlikely. Furthermore, as pointed out by the writer (loc. cit.), neither *C. Gmelini* nor *C. lucida* are truly maritime or littoral species, as suggested by Mathias and Constance. MAP 112.

***Phyllodoce glanduliflora* (Hook.) Cov.**

Little Hyland River, north of Watson Lake, near the Mackenzie District border, Youngman & Tessier, No. 433. Although reported from 'Upper Yukon R. district' by Hultén (1948), the Williams collection upon which his report was based came from Lake Lindemann near the southern half of Lake Bennett, in British Columbia. The present collection, therefore, is the first actually within Yukon Territory. *P. glanduliflora* was reported recently also from the Mackenzie Mts., N.W.T. (Porsild, 1961). MAP 113.

***Vaccinium caespitosum* Michx.**

Vicinity of Mackintosh, elev. 3,000 ft., No. 7695. The collection is the first from SW. Yukon and bridges a gap between the area traversed by the Canol Rd., the Dawson area, and central Alaska (Porsild, 1951). MAP 114.

***Androsace alaskana* Cov. & Standl. in Hult. Fl. Al. and Yukon 8:1278 (1948).**

On gravelly slope near the glacier between Mt. Decoeli and unnamed mountain south of it, fruiting specimens on Aug. 2, No. 8124. The collection is the first from Yukon and represents a notable extension of the range of this rare and little known plant otherwise reported only from a few stations in SW. Alaska. MAP 115.

***Androsace Chamaejasme* Host var. *arctica* Knuth**

Alpine slopes of Mt. Archibald, elev. 4,000 ft., No. 7949; alpine slopes above Vulcan Creek, south end of Kluane Lake, elev. 4,800 ft., No. 8218; Duke R., Kluane Lake, Spetzman, No. 1962-308.

In Yukon thus far known only from a few collections in the Dawson Range, Kluane Lake, and from the Arctic Coast (Porsild, 1951).

***Dodecatheon pauciflorum* (Dur.) Greene**

Mt. Bratnober, in alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-313. A Cordilleran foothill species until recently known north to Slave Lake, N.W.T., and from a single Yukon station near Dawson. It was recently reported also from Liard Hotsprings in northern B.C. and from a single station in NE. Alaska (Porsild, 1951). MAP 116.

***Douglasia arctica* Hook.**

Yukon, west slope of Richardson Mountains, 13 miles southwest of Lapierre House, elev. 2,300 to 3,000 ft., on July 27 with fruiting scapes 5 cm long, Youngman and Tessier, No. 598.

Although discovered nearly 150 years ago *Douglasia arctica* still remains one of the rarest and most localized plants of the American Northwest being known only from a few stations along the arctic coast of Yukon, where it is common locally, and from a few disjunct inland stations in the Richardson Mountains (Porsild, 1943) and, lately, from one station in the White Mountains of central Alaska (Gjaerevoll, No. 143 CAN).

The seeds are plano-convex, 2.5 x 1.3-1.5 mm, dull, dark reddish brown, finely pitted, 2 or 3 in each capsule. MAP 117.

Douglasia Gormanii Constance in Am. Midl. Nat. 19: 257 (1938).

McQuesten Area, south side of Little S. Klondike, Syenite Body, on south-facing talus slope, elev. 5,500 ft., J. D. Campbell, No. 691; Slims R. near south end of Kluane Lake, in alpine tundra, elev. 4,800 ft., flowering on June 26, Spetzman, No. 1962-144; Mt. Bratnober in alpine, rocky tundra, elev. 5,000 ft., flowering on July 9, *idem*, No. 1962-314.

As in the preceding, the length of the fruiting peduncle appears to be variable in *D. Gormanii* varying from 1 to 2 cm in length; in Spetzman's No. 314 however, several almost sessile capsules from the previous season, each containing two fully developed seeds, have survived the winter among the protecting terminal leaves.

A rare and little known endemic of unglaciated central Alaska and Yukon where thus far it is known from less than a dozen stations. MAP 117.

Primula borealis Duby

Donjek floodplains south of Wellesley, Spetzman, No. 1962-311; in flood plain near junction of White and Koidern rivers, *idem*, No. 1962-312.

The discovery of typical *P. borealis* north of Kluane Lake, 2,200 ft. above sea-level and in the deep interior of SW. Yukon, is most unexpected. As noted (Porsild, 1951), *P. borealis* otherwise is known to me as an obligate littoral species, in Mackenzie, Yukon, and Alaska restricted to seashores and the margins of brackish lagoons along the Arctic Coast. The report of *P. borealis* from Kokrines Mts. in western Alaska (Porsild, 1939) is erroneous and was based on a large-grown *P. egaliksensis*. Equally erroneous is Hultén's report (1948, p. 1269) of *P. borealis* from Emerald Lake, B.C., in the southern Canadian Rocky Mountains, based as it is on *P. Maccalliana* Wieg. The latter, as correctly shown by Fernald (Rhodora, 30: 92, 1928), cannot be separated from *P. mistassinica* Michx. MAP 118.

Primula sibirica Jacq.

Vicinity of Mackintosh, near Bear Creek, Nos. 7481 and 7983A; 4 miles up Dezadeash R. valley, in damp mossy places, No. 7366; Haines Rd. near Dezadeash R., Porsild, No. 22309. In Yukon otherwise known from a few widely scattered stations on the central plateau (Hult., 1948; Porsild, 1951). MAP 119.

Primula stricta Hornem.

Mackintosh, margin of alkaline flat, No. 7655; 4 miles up Dezadeash R. in damp, mossy area, No. 7367. In Yukon otherwise known from several stations along the Yukon and its tributaries, but not previously from SW. Yukon.

Trientalis europaea L. ssp. *arctica* (Fisch.) Hult.

Haines Rd. in alpine alder thickets, No. 8281. In Yukon otherwise known from mountains along the Canol Rd. and from the Dawson Dist. (Porsild, 1951). MAP 120.

Gentiana algida Pall.

West side of Dogpack Lake, elev. 5,300 ft., specimens in prefloral state on June 20, Spetzman, No. 1962-315; upper Quill valley acc. to D. Löve (1956).

In Yukon previously reported from a few stations in the SW. part of the Territory (Hultén, 1948).

Gentiana detonsa s. lat.

Gentianella detonsa Rottb. ssp. *yukonensis* Gillett, Ann. Miss. Bot. Gard. 44:215 (1957).

Vicinity of Mackintosh: margin of alkali flat, No. 7654; damp margin of streamlet, Nos. 7438 and 8025; dry places in burned-over spruce forest, No. 8175, flowering and fruiting specimens between July 2 and August 3.

According to Gillett (loc. cit.) collections enumerated from Yukon by the writer (Porsild, 1951) as *G. Macounii* and *G. Raupii* belong in *G. detonsa* ssp. *yukonensis*. Incidentally, Anderson & Brown, No. 10065, from Mackintosh by Gillett (loc. cit.) is erroneously included in the Alaska range given by him for ssp. *yukonensis*. MAP 121.

Gentiana tenella Rottb.

G. falcata sensu Bakewell, Rhodora 45: 314 (1943), not Turcz.

I have seen the Bakewell specimen from moraines near Wolf Creek Glacier in the St. Elias Range, and I agree with Hultén (1948, p. 1312) that it must be referred to *G. tenella* Rottb. MAP 122.

Lomatogonium rotatum (L.) Fr. ssp. *tenuifolium* (Griseb.) Porsild, Nat. Mus. Canada Bull. 135:174 (1951).

Pleurogyne fontana A. Nelson Proc. Biol. Soc. Wash. 17: 177 (1904).

Vicinity of Mackintosh, in mosses near stream, No. 7985; pond margin near Sulphur Lake, No. 8044.

As noted by the writer (Porsild, loc. cit.), the *Lomatogonium* population of interior Alaska and Yukon as well as that of the upper Mackenzie basin and foothills and plains of Canadian Rocky Mts., south to Colorado and east through Alberta and Saskatchewan, clearly constitutes a well-marked geographic race distinguished from the always littoral *L. rotatum* s. str. by taller, up to 60 cm tall, freely branching stems, narrower leaves and calyx lobes, and smaller and very numerous flowers. MAP 123 and PLATE VII.

Menyanthes trifoliata L.

Old Crow River, 19 miles north of village, flowering on July 8, Youngman and Tessier, No. 662. Although in Yukon thus far reported only from a few stations north to Dawson (Porsild, 1951), *Menyanthes* probably is not uncommon in acid bogs north to the limit of trees.

Apocynum androsaemifolium L.

South of Carcross along lakeshore west of Wheaton R., A.E. & R.T. Porsild, No. 18448. In Yukon otherwise known from a few stations along the upper Yukon and its tributaries (Porsild, 1951). MAP 124.

Phlox Richardsonii Hook.

P. Hoodii Hultén, Fl. Al. and Yukon, p. 1318 (1948); Porsild, 1951, p. 276, not Richards.

Badlands Creek north of Burwash Landing, alpine tundra on granite and glacial till, elev. 5,300 ft., flowering on June 11, Spetzman, No. 1962-317; Aishihik Rd. close to Aishihik, forming mats on dry, rocky ground, flowering



Lomatogonium rotatum (L.) Fr. ssp. *tenuifolium* (Griseb.) Porsild. x $\frac{7}{8}$
Bremner, Alta., Sept. 11, 1917, W. C. McCalla. CAN No. 92736.

on June 15, 1960, Mrs. J. Lammers (CAN 264234). Another unreported specimen, from the Geo. Lawson Herb., labelled "W. of Rck. Mts. bet. Ft. Youner & Lapierre Hs., McTlavish" (CAN 230425) may have been collected west of the Alaskan boundary. *Phlox sibirica* reported from mountains west of Burwash Landing (D. Löve, 1956) very likely belong here.

With the more abundant material now available it is clear that *P. Ho* does not occur in Yukon or Alaska where all earlier reports of that species

based on extreme and depauperate forms of *P. Richardsonii* which can generally be separated from *P. Hoodii* by its slightly broader and more blunt leaves and somewhat larger flowers. For alleged differences in the length of corolla tubes (Hultén, loc. cit.), see the writer's discussion (Porsild, 1955, p. 175).

P. Hoodii is a species of arid and stony prairies and foothills in Canada ranging from W. Manitoba to Alberta, north to latitude 53° only.

***Polemonium boreale* Adams**

Alpine shale screes of Mt. Archibald, Nos. 7860 and 7920. In Yukon otherwise known from the Arctic Coast and from the Dawson District (Porsild, 1951).

***Phacelia Franklinii* (R. Br.) Gray**

Champagne, in wet sandy place by road, Spetzman, No. 1962-304; a species of disturbed soils, in southern Yukon rapidly spreading along roads and in recent clearings. MAP 125.

***Eritrichium aretioides* Cham.**

The first Canadian report of this rare plant was from the Arctic Coast of Yukon (Porsild, 1939). Since then several other collections have been made in northern Yukon and from just inside the Mackenzie District: McDougall Pass, N.W.T., 67° 46' N, 136° 02' W, Youngman and Tessier, No. 33; Yukon, upper Firth River, elev. 2,900 ft., 68° 50' N, 140° 33' W, *idem*, No. 143. An unrecorded specimen in the Geo. Lawson Herbarium (CAN) collected in Yukon nearly a hundred years ago by Hudson's Bay Company Factor McTavish is labelled "West of the Rocky Mts. bet. Ft. Youcon & Lapierre House, McT."

***Castilleja hyperborea* Pennell**

Alpine shale scree of Mt. Archibald, No. 7802; alpine slopes of Mt. Decoeli, No. 7970; gravelly places near Mackintosh, Nos. 7589 and 7724; alpine tundra above Vulcan Creek, south end Kluane Lake, elev. 6,000 ft., No. 8248. A well-marked species previously reported from SW. Yukon.

***Castilleja pallida* (L.) Spreng. ssp. *caudata* Pennell**

Dry open places near Mackintosh, No. 7320; dry open prairies above Vulcan Creek, south end of Kluane Lake, No. 8255. Common in Yukon on the Arctic Coast but collected only a few times in the interior.

***Castilleja Raupii* Pennell**

Silver City. Kluane Lake, Spetzman, No. 1962-327. In Yukon otherwise known from a few stations in the Dawson area.

***Castilleja unalaschcensis* (Cham. & Schlecht.) Malte**

Alpine slopes of Mt. Decoeli, No. 7971; open forested slopes of Mt. Archibald, No. 7852; dry roadsides near Mackintosh, No. 7701; Ogilvie Mts. northeast of Dawson, Youngman and Tessier, No. 348. The present series is a close match for material collected along the Canol Rd. (Porsild, 1951).

***Castilleja yukonis* Pennell**

Southwest of Kluane Lake, Spetzman, No. 1962-328; south end of Kluane Lake, Anderson, No. 9511, and M.P. and R.T. Porsild, No. 143. In Yukon otherwise known from the type locality, Lewes R., and from a few other stations along the upper Yukon and its tributaries.

***Euphrasia subarctica* Raup**

Vicinity of Mackintosh: moist open places in disturbed soil, No. 7662; margin of alkali flat, No. 7663; slopes of stony outcrop, No. 8977; gravel margin of streamlet, No. 7981; south of Carcross along lakeshore west of Wheaton R., A.E. & R.T. Porsild, Nos. 18450-1. Probably common in open places in southern interior Yukon, where specimens reported as *E. disjuncta* (Porsild, 1951), according to revision (in herb.) by Sell & Yeo, should be referred to *E. subarctica*. MAP 126.

***Lagotis Stelleri* (Cham. & Schlecht.) Rupr.**

McQuesten Area, east side of White Mt. in moist alpine meadow, elev. 4,500-5,000 ft., J. D. Campbell, No. 155. An Amphi-Beringian species in Yukon collected only a few times on the Arctic Coast and in high-alpine situations on the unglaciated central plateau (Porsild, 1951).

***Pedicularis lanata* Cham. & Schlecht.**

Alpine slopes between Mt. Decoeli and unnamed mountain south of it, elev. 4,500 ft., No. 8149; alpine slope of Mt. Archibald, No. 7863; Slims River alpine tundra, elev. 4,800 ft., Spetzman, No. 1962-339; Dogpack Lake, alpine tundra on limestone hill, elev. 5,300 ft., *idem*, No. 1962-335; Quill Creek area (D. Löve, 1956). These collections represent a slight southward extension of the Yukon range of this arctic species.

***Pedicularis Oederi* Vahl**

McQuesten Area, south side of Little S. Klondike, Syenite Body, wet places on south-facing slope, elev. 6,000 ft., J. D. Campbell, No. 684; Quill Creek area (D. Löve, 1956). A rare species in Yukon where it has been collected only a few times and always on high mountains of the unglaciated central plateau (Porsild, 1951). MAP 127.

***Syntherisma borealis* Pennell**

Ogilvie Mountains, south of Chapman Lake, 64° 35' N, 138° 20' W, elev. 5,000 ft., Youngman and Tessier, No. 468. A very rare plant thus far known only from a few alpine stations in mountains of central Yukon and Alaska.

***Veronica alpina* L. var. *unalaschensis* Cham. & Schlecht.**

Dry, open places in vicinity of Mackintosh, elev. 3,000 ft., No. 7706. In Yukon previously reported from the Canol Rd. area (Porsild, 1951).

***Veronica americana* Schwein.**

Near Mackintosh in swampy woods, No. 7578. Apparently rare in Yukon where it has been reported only a few times (Porsild, 1951). MAP 128.

***Veronica scutellata* L.**

Mackintosh, in springy places near Mile 1037, No. 7742. Junction of Stewart and Yukon rivers, June 28, 1939, R. T. Porsild. MAP 129.

***Boschniakia rossica* (Cham. & Schlecht.) B. Fedtsch.**

Junction of White and Koidern rivers, Spetzman, No. 1962-340. In Yukon previously reported from a number of stations in the southern part (Porsild, 1951).

The main range of *Boschniakia rossica* is in Asia where, according to Beck-Mannagetta (1930), it extends from the lower Jenisei River east to Chukotka.

Peninsula, and south to Lake Baical, Kamchatka, northern China, and Japan.

In America *Boschniakia* is a boreal forest species parasitic chiefly on *Alnus crispa* and *Picea glauca* and is restricted to mature, open, and well-drained white spruce-alder forest with a well-developed *Pleurozium Schreberi*-*Hylocomium splendens* bottom layer, but is absent in black spruce muskegs. In Yukon it ascends to 4,500 ft. on Mt. Sheldon, but generally is restricted to the well-forested mountain slopes and valleys.

Presumably *Boschniakia* must have reached unglaciated parts of Alaska-Yukon across the Beringian land bridge at a time when its main host, *Alnus crispa* grew there. Although ecological and edaphic conditions would appear suitable to its requirements through most of the Canadian boreal forest region, *Boschniakia* has scarcely extended its area in post-glacial time. East of the Mackenzie valley there are isolated and limited populations on Great Bear Lake and near the east end of Great Slave Lake. South of the 60th parallel it is known from a number of stations in the Alaska panhandle but in British Columbia thus far has been recorded but once, at Muncho Lake.

In common with other members of the *Orobanchaceae*, *Boschniakia rossica* regularly produces an abundance of seeds. These are small and light and dispersed by the wind, often on the first snow of the year. With the melt-water the seeds next spring are probably washed through the moss layer and presumably will germinate only when in contact with roots of a potential host plant.

As noted by the writer (Porsild, 1961), Hultén (1949) erroneously assumed that *B. strobilacea* Gray, cited in Henry's Flora of Southern British Columbia, is identical with *B. rossica*. *B. strobilacea* sensu Henry is *Kopsiopsis tuberosa* (Hook.) G. Beck, based on *Orobanche tuberosa* Hook., in Fl. Bor.-Am. 2: 92, tab. 168 which in the southern tip of Vancouver Island reaches its northern limit along the Pacific Coast. MAP 130.

Utricularia vulgaris L. var. *americana* Gray

In pond near Alsek Lake, No. 8189. Probably common in Yukon but not previously reported from the southwest.

Plantago eriopoda Torr.

Bear Creek, dry terrace, elev. 2,100 ft., Spetzman, No. 1962-342; vicinity of Mackintosh, in open areas of alkali flat, Nos. 7667-8, the last number with unusually broad leaves of which some measure 4 cm across. In Yukon previously collected a few times in the dry interior southwest (Porsild, 1951). MAP 131.

Plantago septata Morris

Dry open places on hilltop near Mackintosh, No. 7766; Champagne, dry sunny slope, elev. 2,000 ft., Spetzman, No. 1962-341. In Yukon reported from a number of stations on the dry, interior plateau where it grows in dry gravelly and sandy places, but never in saline or alkaline soil.

Galium trifidum L.

Bell River, 11 miles northeast of Lapierre House, Youngman and Tessier, No. 626. In Yukon not reported from north of Dawson City but common in boggy places along the Mackenzie north to the Delta (Porsild, 1943).

Galium triflorum Michx.

In damp willow thickets on Mt. Archibald, elev. 4,000 ft., No. 7906. Ap-

parently a rare species in Yukon where, otherwise, it has been reported from a single station in the Pelly Range (Porsild, 1951). MAP 132.

Adoxa Moschatellina L.

In damp alder thickets on Mt. Archibald, No. 7815. Fruiting specimens on July 17. In Yukon otherwise known from a few collections in the Dawson District and in the Pelly Mts. along Canol Rd. (Porsild, 1951). MAP 133.

Valeriana capitata Pall.

Near Mackintosh, in damp forest, No. 7449; damp margin of streamlet No. 7572. An Amphi-Beringian species, in Yukon thus far known only from the western interior and from the Arctic Coast (Porsild, 1951), but in the Mackenzie District common also in the Richardson Mts., and recently collected on the east slope of the Mackenzie Mts. at lat. $63^{\circ} 20' N$, and long. $129^{\circ} 30' W$, Richard J. Hopp (CAN). MAP 134.

Valeriana sitchensis Bong.

In damp willow thickets on Mt. Archibald, elev. 4,000 ft., No. 7907. A Cordilleran-Pacific coast species, in Yukon otherwise known from a number of stations in the Pelly and Selwyn ranges (Porsild, 1951). MAP 135.

Campanula uniflora L.

Rich herb mats on Mt. Archibald, elev. 4,000 ft., No. 7913; reported from upper Quill valley by D. Löve (1956). A very rare plant in Yukon where it is otherwise known only from Dawson and from two stations along the Alaska-Yukon border.

Agoseris aurantiaca (Hook.) Greene

In damp area near Bear Creek Summit, Mile 1028, elev. 3,000 ft., No. 7901. A Cordilleran species, in Yukon reported from alpine relic prairies in the Pelly and Selwyn ranges (Porsild, 1951). MAP 136.

Antennaria alborosea Porsild, Can. Field-Nat. 64: 17 (1950) and Nat. Mus. Canada Bull. 121: 312 (1951), tab. 33, figs. 1-4.

Vicinity of Mackintosh: dry roadsides, No. 7735; damp places 4 miles up Dezadeash valley, No. 7353. A tall, rather handsome species with pink, outer phyllaries described from the Pelly Mts., and in Yukon otherwise known from a few stations in the interior (Porsild, loc. cit.). MAP 137.

Antennaria elegans Porsild in Can. Field-Nat. 64:18 (1950) and Nat. Mus. Canada Bull. 121: 314 (1951), tab. 34, figs. 1-6.

Bear Creek on gravel terrace, elev. 2,100 ft., Spetzman, No. 1962-349; Champagne, on sandy slope, *idem*, No. 1962-347. Otherwise known from mountains of SE. Yukon, Liard Hotsprings, northern B.C., and Gt. Bear Lake MAP 138.

Antennaria incarnata Porsild, Can. Field-Nat. 64:19 (1950) and Nat. Mus. Canada Bull. 121:314 (1951), tab. 34, figs. 1-3.

Dry open places near Mackintosh, No. 7760. In Yukon otherwise known only from the type locality in the Pelly Mts. MAP 139.

Antennaria pallida E. Nels.

Vicinity of Mackintosh, up Alsek valley, No. 7569; Mt. Archibald, damp

places at summit of shale scree, No. 7883. New to Yukon but previously reported from the Haines Rd., B.C. (Porsild, 1950). MAP 140.

Antennaria subviscosa Fern.

Haines Rd. near Dezadeash, dry slopes, A.E. & R.T. Porsild, No. 22310; vicinity of Mackintosh, open places, No. 7418; up Alsek valley, moist limestone slope, No. 7537; Alaska Highway, Canyon, Mile 996, Mrs. Lammers, flowering specimens on June 4. In Yukon otherwise known from a few stations in the Pelly Mts. (Porsild, 1951). MAP 141.

Arnica alpina (L.) Olin ssp. *angustifolia* (J. Vahl) Maguire

Burwash Landing along shores of lake, Spetzman, No. 1962-351. An arctic species in Yukon otherwise known from the Arctic Coast and from mountains along the Canol Rd. (Porsild, 1951).

Arnica amplexicaulis Nutt.

Damp roadsides along Haines Rd., Mile 125, No. 8260. A Pacific coast species previously reported from White Pass near the B.C.-Yukon border. The present is the first collection within Yukon. A most unexpected and widely disjunct station for this species was recently reported from the east slope of the Mackenzie Mts. (Porsild, 1960A). MAP 142.

Arnica Chamissonis Less. ssp. *incana* (Gray) Maguire

Near Mackintosh, between Bear Creek and Pine Creek, No. 7627. The ssp. *incana* has been reported from SW. Yukon, near Lake Dezadeash (Maguire, 1943) whereas ssp. *foliosa* is known from a number of stations in the Pelly Mts. (Porsild, 1951). MAP 143.

Arnica louiseana Farr ssp. *frigida* (Mey. ex Iljin) Maguire

Mile 100, Haines Rd., dry places near stream, No. 8271. The writer (Porsild, 1951) noted that *A. louiseana* in the Pelly Mts. of SE. Yukon more closely approaches the Cordilleran race ssp. *genuina* than the Amphi-Beringian ssp. *frigida* to which race Maguire (in herb.) has referred all Yukon material of *A. louiseana*. MAP 144.

Artemisia alaskana Rydb.

Alpine slopes 4 miles up the Dezadeash River valley from Mackintosh, No. 7392. McQuesten Area, Little S. Klondike, on dry south-facing slope, J. D. Campbell, Nos. 707 and 717. In Yukon previously reported from Kluane Lake and from the Pelly Mts. (Porsild, 1951). MAP 145.

Artemisia Dracunculus L.

Alpine slope 4 miles up the Dezadeash River valley from Mackintosh, No. 7381; dry south-facing slope above Vulcan Creek, south end of Kluane Lake, No. 8211. In Yukon thus far known only from the southern dry interior plateau (Porsild, 1951, as *A. dracunculoides* Pursh). MAP 146.

Artemisia hyperborea Rydb.

Gravelly slope 4 miles up Dezadeash valley from Mackintosh, No. 7393; alpine tundra on Mt. Archibald, No. 7843; dry scree on slopes between Mt. Decoeli and unnamed mountain south of it, elev. 4,600 ft., No. 8154; Kluane Lake; Slims R., alpine tundra, elev. 4,800 ft., Spetzman, No. 1962-354; hills north of Badlands Creek, elev. 5,400 ft., *idem*, No. 1962-354; hills at north end

of Talbot arm, elev. 5,000 ft., *idem*, No. 1962-352. For a discussion of the status of this rare and little understood plant, not previously reported from Yukon, together with illustrations of typical specimens from the Mackenzie Delta and Victoria Island, see Porsild (1955, tab. xxiii, and 1957, fig. 27, c). The present collections are the first from Yukon and represent a notable extension of the known range of this arctic species. MAP 147.

Aster alpinus L. ssp. Vierhapperi Onno

Alpine tundra above Vulcan Creek, south end of Kluane Lake, elev. 4,800 ft., No. 8235; Kluane L., dry gravel terrace, Spetzman, No. 1962-363; Champagne, dry sandy slope, elev. 2,000 ft., *idem*, Nos. 1962-364-5. The first number of the present series differs markedly from typical ssp. *Vierhapperi* by its deep pink ray flowers and oblanceolate, rather obtuse basal leaves and at first glance is somewhat reminiscent of the Rocky Mountain race of *Erigeron grandiflorus*. Its oblong, short-acuminate phyllaries, as well as other floral characters, however, are those of *Aster alpinus*. In Yukon, typical *A. alpinus* ssp. *Vierhapperi* has been collected previously near Kluane Lake and in the Pelly Mts., where the writer (1951, p. 297) noted that pink or lavender ray flowers were occasionally seen in plants growing on calcareous soil. MAP 148.

Aster junciformis Rydb.

In spruce bogs near Mackintosh, Nos. 7583, 7887, and 8099. In Yukon previously reported from Haines Rd. and White River, both in SW. Yukon (Porsild, 1951). MAP 149.

Cirsium foliosum (Hook.) DC.

Alpine slope by roadside near Mile 100 on Haines Rd., No. 8297. In Yukon otherwise known from subalpine relic prairies along the Canol Rd. in Pelly and Selwyn ranges (Porsild, 1951). MAP 150.

Crepis nana Richards.

Alpine shale scree on Mt. Archibald, No. 7836; damp gravel slope between Mt. Decoeli and unnamed mountain south of it, elev. 5,000 ft., No. 8111; along the Quill Creek road, acc. to D. Löve (1956). An arctic-alpine species in Yukon otherwise known from a few stations in the Pelly Mts. and from Black R. near the Alaskan border.

Crepis tectorum L.

Roadside near Mackintosh, No. 7477. An introduced weed apparently not previously reported for Yukon.

Erigeron acris L. var. asteroides (Andrz.) DC.

E. angulosus Gaud. var. *kamtschaticus* (DC.) Hara

Lapierre House, in open grassy area, Youngman and Tessier, No. 624. In Yukon not reported north of the Dawson district (Porsild, 1951) and in the Mackenzie valley not known north of the Arctic Circle (Porsild, 1943).

Erigeron grandiflorus Hook.

Alpine slopes of Mt. Archibald, margins of rocky, barren patches, No. 7822; upper Quill Creek valley, acc. to D. Löve (1956). A rare plant in Yukon where it has been collected a few times on the Arctic Coast and on the central plateau. The fine specimens from Mt. Archibald closely agree with others from

interior Yukon and Alaska. (For a discussion of the variations or 'races' of *E. grandiflorus*, see Porsild, 1955, p. 181-2 and pl. xxii, figs. 1-4.)

Erigeron purpuratus Greene

Dry gravel plain 4 miles up the Dezadeash R. valley from Mackintosh, No. 7388; alpine scree slope on Mt. Archibald, elev. 4,000 ft., Nos. 7819 and 7910; Kluane Lake, Burwash Landing, Spetzman, No. 1962-366. In Yukon previously reported from Ft. Selkirk on the Yukon River, Donjek River, Kluane Lake, White R., and from the St. Elias Range (Cronquist, 1947; Hultén, 1950). Another unreported Yukon specimen was collected in the McQuesten Area, John D. Campbell, No. 705 (CAN).

All Yukon material before me differs from that of Alaska by being of somewhat matted habit and by being considerably more hirsute on leaves, stems, and phyllaries. In the two numbers from Mt. Archibald the entire plant appears grey because of its dense covering of long villous hairs. MAP 151.

Erigeron unalaschensis (DC.) Vierh.

Damp alpine slopes of Mt. Archibald, elev. 4,000 ft., No. 7948; damp places on wooded slopes of Mt. Decoeli, No. 8091. Both collections belong to the Yukon alpine 'race,' distinguished by small heads and bluish-black involucres as noted by the writer in the Pelly Mts. as do specimens from upper Quill Creek valley reported by D. Löve (1956) (see Porsild, 1951, p. 303).

Haplopappus MacLeanii Brandege

McQuesten Area, on grassy river terraces 3 miles east of Pelly Farm, J. D. Campbell, No. 34. An endemic of the unglaciated central Yukon Plateau where thus far it is known only from a few stations all on gravelly river terraces along the Yukon and its tributaries (Porsild, 1951).

Hieracium gracile Hook.

Wooded slopes of Mt. Decoeli, No. 8086; alpine slopes near Mile 100 on Haines Rd., elev. 5,800 ft., No. 8285; approximately same place, Porsild, No. 22330. A Cordilleran alpine species, in Yukon otherwise reported from mountains along the Canol Rd. (Porsild, 1951). MAP 152.

Petasites hyperboreus Rydb.

Alaska Highway near Bear Creek Summit, elev. 3,000 ft., No. 7894; among willows on damp alpine slopes of Mt. Archibald, elev. 4,000 ft., No. 7928; damp tundra slopes between Mt. Decoeli and unnamed mountain south of it, No. 8117. A Cordilleran-Pacific coast species, in Yukon previously collected a few times and mainly in the southernmost parts (Porsild, 1951). MAP 153.

Saussurea angustifolia DC. var. *yukonensis* Porsild, Nat. Mus. Canada Bull. 101: 28 (1945); *S. viscida* var. *yukonensis*, Hultén in Fl. Al. and Yukon 10: 1629 (1950).

Mossy, alpine slope of Mt. Decoeli, elev. 4,100 ft., in damp tundra, elev. 4,700 ft., Nos. 8064 and 8137; along Quill Creek acc. to D. Löve (1956); McQuesten Area, south side of Little S. Klondike, elev. 6,000 ft., J. D. Campbell, No. 697. In Yukon otherwise known from a few stations from the central plateau.

I see no convincing reason for considering this taxon a variety of *S. viscida*

rather than of *S. angustifolia* DC. as done by Hultén, Fl. Al. and Yukon (1950). MAP 154.

***Senecio conterminus* Greenm.**

Bear Creek, Mile 1022, No. 7327; 4 miles up Dezadeash valley from Mackintosh, on a scree slope, No. 7361; alpine slopes of Mt. Decoeli, on frost boils, No. 7966. In Yukon otherwise known from the Mayo and Dawson districts and from White River.

Senecio conterminus and *S. hyperborealis* Greenm. are rather similar in habit. In the first the achenes are always totally glabrous, and the plant generally is somewhat floccose on the leaves, stem, and involucres. In the Northwest it appears to occupy a fairly large area in interior Alaska and Yukon, but thus far has not been reported from the Mackenzie District. Future exploration may close the apparent 1,000-mile gap between the Alaska-Yukon population and the somewhat smaller one in the mountains of southern Alberta and British Columbia. *S. hyperborealis* has hispid achenes and is quite glabrous, except for persistent flocculent tufts of white hairs, at the base of the leaves. It appears to be endemic to the Northwest with a range extending from Alaska-Yukon eastward to Gt. Bear Lake, north to Banks Island and south approximately to latitude 60°. MAP 155.

***Senecio Kjellmanii* Porsild**

Mt. Bratnober, Spetzman, No. 1962-358; upper Quill Creek valley, acc. to D. Löve (1956). The present collection bridges a gap between Kluane Lake and the Pelly Mts. (Porsild, 1951). MAP 156.

***Senecio Lindstroemii* (Ostf.) Porsild in Nat. Mus. Canada Bull. 101: 27 (1945).**

S. integrifolius (L.) Clairv. var. *Lindstroemii* Ostf. in Kria. Vidensk.-Selsk. Skr., Mathem.-Naturv. Kl. 8:70, tab. 3, fig. 20 (1910), not *S. integrifolius* Hooker in Fl. Bor.-Am. 1:335 (1834), nor *Cineraria integrifolia* Richardson in Frankl. 1st Journey App. p. 748 (1823).

S. fuscatus Hult. Fl. Al. and Yukon 10:1610, fig. 5, a-d (1950), not *Tephroseris fuscata* Jord. & Fourr., nor *Senecio fuscatus* Hayek, Allgem. Bot. Zeitschr. 23: 4 (1917).

S. denalii Nelson in Am. J. Bot. 32: 289 (1945).

S. bivestitus Cronq. Leaflet. West. Bot. 6: 47 (1950).

Alpine slopes of Mt. Archibald, elev. 4,000 ft., No. 7912; alpine slope of Mt. Decoeli, No. 8069; Mt. Bratnober, alpine tundra, elev. 5,000 ft., Spetzman, No. 1962-357; upper Quill Creek area, acc. to D. Löve (1956); Ogilvie Mts., Youngman and Tessier, No. 350. An Amphi-Beringian species, in Yukon otherwise known from the Arctic Coast and from a few collections in mountains along the Alaska-Yukon boundary.

Hultén (loc. cit.) stated that "this Alaskan plant is found not only in Siberia but also in central Europe," and that "In Europe it has usually been included in *S. capitatus* or taken as a variety of *S. aurantiacus*." These views apparently are accepted by Cronquist (1955). In Hegi Ill. Fl. Mitt.-Europa vi 2: 745, *Senecio aurantiacus* aut. Helv., non Hoppe, together with *Tephroseris fuscata* Jord. & Fourr. and *Senecio fuscatus* Hayek are given as straight synonyms of *S. capitatus* (Wahlenb.) DC., but the plants described (and illustrated in fig. 447 c and d) bear only a very superficial resemblance to the Alaskan plant discussed by Hultén, in which the flowering heads are much larger, with from 35-42 phyllaries

even in small heads, against 21 in *S. capitatus* according to Hegi (loc. cit.), or only 14 or 15 in the head illustrated (loc. cit.). In the North American plant the ligules average 15 mm in length whereas those of *S. capitatus*, according to Hegi, are from 5 to 12 mm long, and the diameter of the head from 2 to 3 cm, against an average of 4 cm in the American plant (cf. also Ostenfeld, loc. cit.). The two Carpathian plants illustrated by Hultén (loc. cit., fig. 5 c and d) do not look like the American plant and, as nearly as can be judged, have 13 to 15 phyllaries as has also a plant now before me from Caucasus, distributed by Herb. Inst. Acad. Sci. URSS, originally labelled *S. aurantiacus*, but by Schischkin changed to *S. caucasigenus* Schischk. in Not. Syst. Herb. Bot. Acad. Sci. USSR xvi: 427 (1954).

In Fl. Kamtch. 2: 205 (1930) Hultén stated that *S. tundricola* Tolm. "probably is identical with *S. integrifolius* var. *Lindstroemii* Ostenf." and in Fl. Al. and Yukon 10:1613 (1950), under *S. fuscatus*, he discusses a plant from Cape Lisburne, Alaska, (Anderson, No. 4567) which "gives the impression of being intermediate between *S. fuscatus* and *S. integrifolius*," and, further, that *S. tundricola* [*S. tuncraicola*] in his opinion represents such an intermediate type. The description of *S. tundricola* Tolm. in Comptes Rend. l'Acad. Sci. URSS p. 226 (1928) admittedly is sketchy, but the photograph which accompanies it bears not the slightest resemblance to *S. fuscatus* Hayek or to *S. Lindstroemii*, showing a plant with a single radiate head judged to be no more than 28 mm in diameter, with broad ligules approximately $2\frac{1}{2}$ times longer than broad. Judging again from the illustration, the affinity of *S. tundricola* Tolm. is clearly with *S. atropurpureus* (Ledeb.) Fedtsch. rather than with *S. fuscatus* or *S. Lindstroemii*, and most likely it is the large-headed *S. atropurpureus* var. *Ulmeri* (Steffen) Porsild or *S. Kjellmanii* Porsild, both known from Alaska, Yukon, and eastern Siberia.

The kind of distribution visualized by Hultén for *S. fuscatus* Hayek, and by Cronquist (loc. cit., 1955), expanded to include a widely disjunct station in the Beartooth Range of Montana and Wyoming (unknown to Hultén, in 1950), would be most unusual, if not unique.

The Beartooth Range plant, as known to me in the field as well as from several Herbarium sheets, in all respects is a perfect match for the Alaska-Yukon plant, but its relation to *S. fuscatus* Hayek, the type of which came from mountains of central Europe, certainly is questionable. *S. denalii* Nelson described from Mt. McKinley Park, Alaska, and *S. bivestitus* Cronq., originally applied to the Beartooth Range plant, both are antedated by *S. Lindstroemii*.

Although I have seen no specimen from E. Asia matching the Alaska-Yukon plant, its presence in Chukotsk Peninsula is to be expected. In common with a great many plants of Amphi-Beringian range, that of *S. Lindstroemii* does not extend east of the Mackenzie River. From the distribution reported it is clear that neither *Cineraria integrifolia* sensu Richardson nor *Senecio integrifolia* sensu Hooker can be our plant. MAP 157.

Senecio sheldonensis Porsild in Can. Field-Nat. 64: 45 (1950) and Nat. Mus. Canada Bull. 121: 334, and tab. xxxvi (1951).

Damp, wooded slopes of Mt. Decoli, No. 8065. The specimens which had flowers and young fruits on July 29 are a close match for the type series from Mt. Sheldon on the upper Canol Rd. in the Selwyn Range. MAP 158.

Senecio yukonensis Porsild, Can. Field-Nat. 64 : 44 (1950).

S. alaskanus Hult., Fl. Al. and Yukon, p. 1602 (1950).

Mouth of Blow River on the arctic coast of Yukon, Youngman and Tessier, No. 556. This is the first collection of *S. yukonensis* from arctic Yukon, but it was reported as *S. alaskanus* from the north slope of Brooks Range, Alaska (Wiggins, 1962).

Tanacetum huronense Nutt.

T. bipinnatum Porsild in Nat. Mus. Canada Bull. 131 : 320 (1951).

McQuesten Area, river flat 2 miles east of Pelly farm, J. D. Campbell, No. 55.

Although the interrelation of Alaskan *T. bipinnatum* to *T. huronense* or the relation of the latter with the eastern *T. huronense* var. *bifarium* Fern. is not clear, Hultén (1950) has shown that *T. bipinnatum*, commonly with one large head and distinguished by dark-margined involucre scales and longer ligules, appears to be an Amphi-Beringian race. The Alaskan range shown in Hultén's map fig. 1157 should, however, be extended to include the north slope of Brooks Range. The taller *T. huronense*, commonly with three or more smaller heads and pale-margined involucre scales, is an inland race, and apparently the only one occurring in Yukon and the Mackenzie District.

Townsendia Hookeri Beaman in Contrib. Gray Herb. 183 : 95 (1951).

Aishihik Rd. near Alaska Highway, on dry embankments of silt, elev. 2,500 ft., flowering on May 15, 1960, Mrs. J. Lammers. In referring the above collection to *T. Hookeri*, I am following Beaman's (1957) revision, although I must confess to the greatest difficulty in separating Canadian material by him distinguished as *T. Hookeri* and *T. exscapa* (Richards.) Porter. However, whichever name is applied, the discovery of a member of the genus *Townsendia* in central Yukon, a thousand miles beyond its nearest station in the Canadian Rocky Mts., is most unexpected. MAP 159.

SUPPLEMENT

Several years have elapsed since the writer commenced the preparation of his "Contributions to the Flora of southwestern Yukon." While still in preparation several important new collections of southwestern Yukon plants came to hand, of which the more important were incorporated in the manuscript. A short time ago, when the paper was already in proof, Dr. A. M. Pearson of the Canadian Wildlife Service submitted a fine collection of plants made during the spring and summer of 1965 as part of a grizzly bear study in the Alsek River area. These plants were collected mainly in alpine situations not previously visited by botanists. The more interesting of Dr. Pearson's plants were collected (1) near the terminus of Dusty Glacier, 34 miles southwest of Haines Junction, in lat. 60° 23' and long. 138° 12'; (2) west side of the upper Alsek River; (3) summit of Sugden Creek Pass, lat. 60° 44' and long. 137° 53'; and (4) Amphitheatre Mt., 16 miles SW. of Burwash Landing, lat. 61° 17' and long. 139° 25'. A complete set of his plants is deposited in the National Herbarium of Canada; the following list includes the more important:

Veratrum Eschscholtzii A. Gray

Dusty Glacier on moist creek bottom, 3,000 ft. elev., No. 284.

Salix Scouleriana Barr. var. *coetanea* Ball

Alsek Valley, on dry outwash gravel, 2,000 ft. elev., tall, tree-like bushes, Nos. 26, 31, and 44.

Raup (1959), commenting on the apparently discontinuous range of *S. Scouleriana* along the Alaska Highway, noted that this conspicuous willow had not yet been found in southwestern Yukon west of Whitehorse. When Dr. Raup and his party did not see it, it may be safely assumed that its occurrence in the Alsek valley is highly local.

Claytonia tuberosa Pall. ex Willd.

Amphitheatre Mt. on wet and steep slopes at 6,000 ft. elev., No. 224. An Amphi-Beringian species, wide-ranging but apparently always local in unglaciated parts of Alaska, barely entering Yukon Territory where it has been reported but once from the McArthur Range (Porsild, 1951).

Melandrium Ostenfeldii Porsild

Open spruce forest west of Alsek Lake, elev. 2,000 ft. where it was associated with *Arenaria lateriflora*, *Silene Menziesii*, and *Penstemon procerus*, No. 170A.

Papaver Keelei Porsild

On steep, wet slopes of Amphitheatre Mt., elev. 6,000 ft., No. 223.

Cardamine umbellata Greene

Dusty Glacier on south-facing slopes at 3,800 ft. elev., where associated with *Veronica alpina* var. *unalaschensis* and *Luzula parviflora*, No. 240.

Draba crassifolia Grah.

Alpine slope near upper end of Alsek Lake, elev. 5,500 ft. where associated with *Draba lonchocarpa* and *Potentilla Ledebouriana*, No. 192B.

Draba incerta Payson

Same as above, No. 192A.

Draba Palanderiana Kjellm.

Alpine slopes near junction of Kaskawulsh and Dezadeash rivers, elev. 6,000 ft., associated with *Myosotis alpestris* ssp. *asiatica* and *Oxytropis Maydelliana*, No. 180.

Eutrema Edwardsii R. Br.

Amphitheatre Mt., elev. 6,000 ft., associated with *Draba longipes* and *Melandrium apetalum* ssp. *arcticum*, No. 218A.

Saxifraga adscendens L.

Upper end of Alsek Lake, between 3,000 and 4,000 ft. elev., No. 184B.

Saxifraga caespitosa L. ssp. *monticola* (Small) Porsild

Alpine slopes near junction of Kaskawulsh and Dezadeash rivers, elev. 6,000 ft., associated with *Antennaria monocephala* and *Oxytropis Huddelsonii*, No. 181B.

Saxifraga davurica Willd. ssp. *grandipetala* (Engl. & Irmsch.) Hult.

Amphitheatre Mt., elev. 6,000 ft., No. 217.

Potentilla rubricaulis Lehm.

Alsek Pass, elev. 2,000 ft. on gravelly site where associated with *Potentilla nivea* ssp. *Hookeriana*, *Draba cinerea*, and *Polemonium pulcherrimum*, No. 12C. In Yukon otherwise known from a single collection in the Rose-Lapie Pass in the Pelly Range, and from the Arctic Coast (Porsild, 1951).

Oxytropis Scammaniana Hult.

Amphitheatre Mt. on flat terrace, elev. 5,500 ft., No. 203.

Cassiope Stelleriana (Pall.) DC.

Dusty Glacier on north-facing slope, elev. 3,800 ft., No. 246. A Pacific Coast species in Yukon, otherwise known from a single collection on Dominion Creek southwest of Dawson (Hultén, 1948).

Cassiope tetragona (L.) D. Don ssp. *saximontana* (Small) Porsild

North slope of mountain west of Dusty River, elev. 4,400 ft. where also the more common ssp. *tetragona* was collected, No. 230.

Phyllodoce empetrifolia (Sm.) D. Don

Moist north slope near Dusty Glacier, elev. 3,800 ft., where associated with *P. glanduliflora* and *Cassiope Stelleriana*, Nos. 244-5. The collection is the first from southwest Yukon.

Phyllodoce glanduliflora (Hook.) Cov.

See above, No. 248.

Castilleja Henryae Pennell in Proc. Acad. Nat. Sci. Phil. 86:534 (1934)

Moist alpine meadow west of Mile 68 on Haines Rd., B.C., elev. 2,700 ft., No. 278.

C. Henryae, as far as I know, until now was known only from the type locality, the head of Besa River, a tributary to the Prophet, in the Peace River District of NE. British Columbia, and from Blair Mt. which is probably in the Cassiar District of British Columbia rather than Alberta as recorded by Pennell (loc. cit.). The Pearson collection closely matches Pennell's detailed description and also the Blair Mt. plant (CAN 111986). Judging from the two collections now before me, *C. Henryae* is a very good and distinct species, perhaps most closely related to *C. parviflora* Bong. of the Pacific Northwest. Mile 86 on the Haines Rd. is close to the Yukon border, and I fully expect that *C. Henryae* will be found also in the mountains of SW. Yukon.

Senecio conterminus Greenm.

West side of Alsek Valley, elev. 2,000 ft., No. 101, and mountain west of Dusty Mt., elev. 4,000 ft., No. 226.

Senecio Kjellmanii Porsild

Amphitheatre Mt., moist west slope, elev. 5,500 ft., No. 201; alpine tundra in Sugden Creek Pass, elev. 4,900 ft., No. 253, in the last place associated with *Antennaria monocephala* and *Oxyria digyna*.

Senecio Lindstroemii (Ostf.) Porsild

Western, steep slope of Amphitheatre Mt., elev. 6,000 ft., No. 222.

OTTAWA, February 1966.

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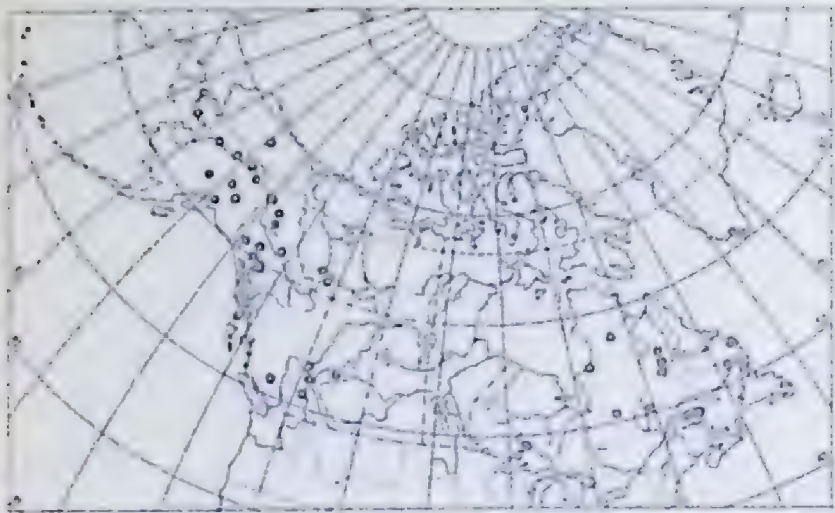
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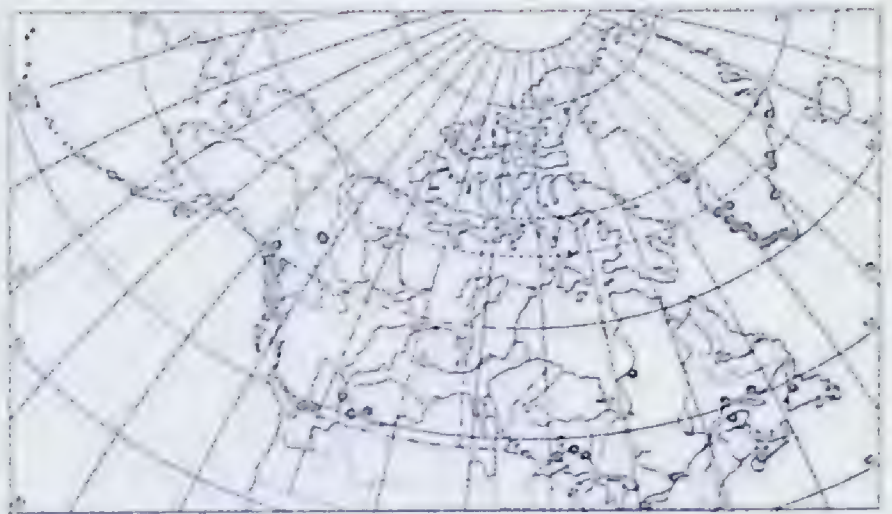
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1. *Cystopteris montana* (Lam.) Bernh.



2. *Botrychium lanceolatum* (Gmel.) Angstr.



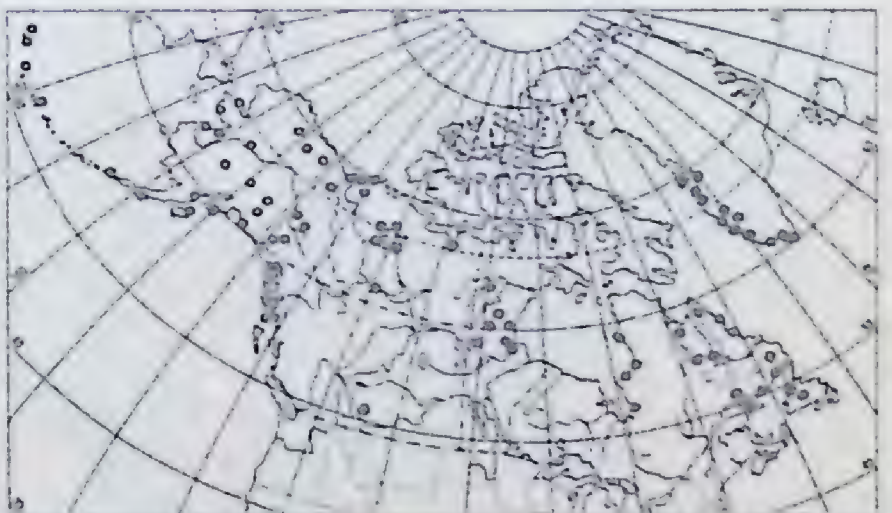
3. *Lycopodium sabinaefolium* Willd. var. *sitchense* (Rupr.) Fern.



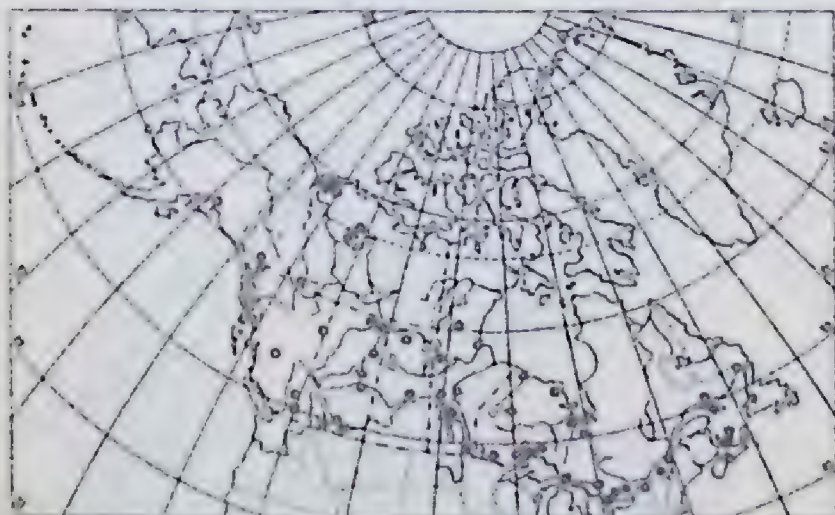
4. *Selaginella selaginoides* (L.) Link



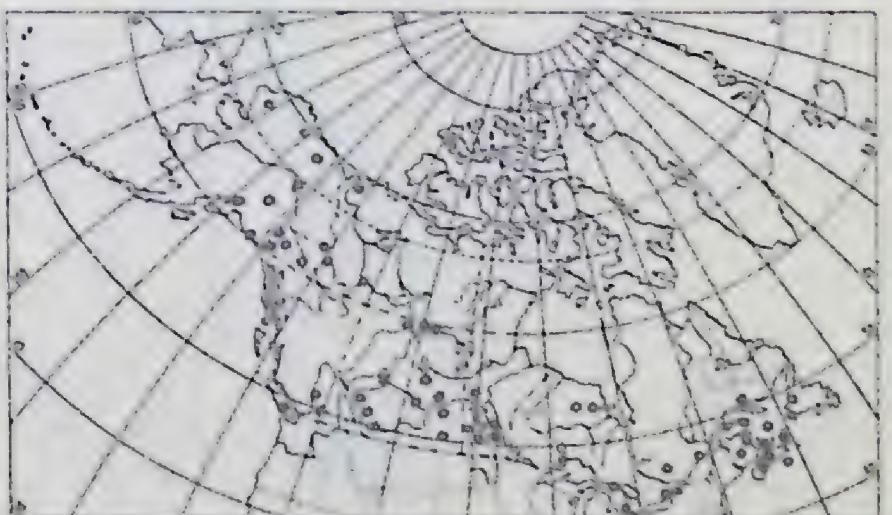
5. *Selaginella sibirica* (Milde) Hieron.



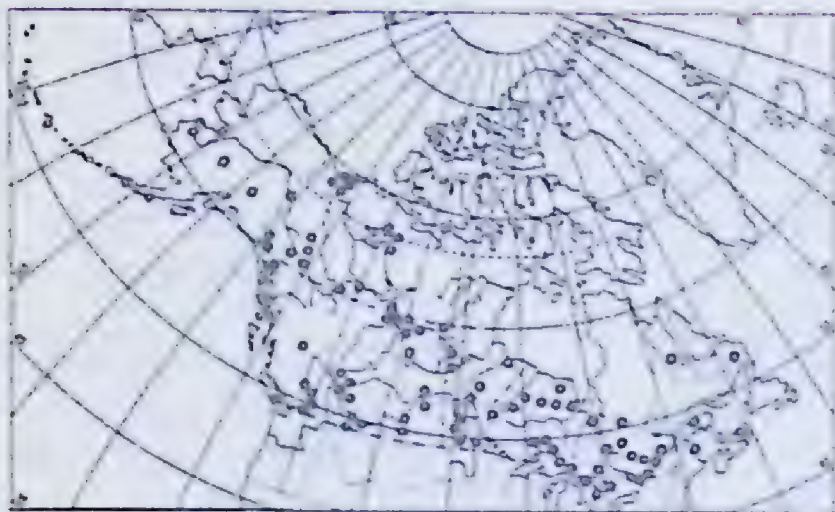
6. *Sparganium hyperboreum* Laest.



7. *Potamogeton Friesii* Rupr.



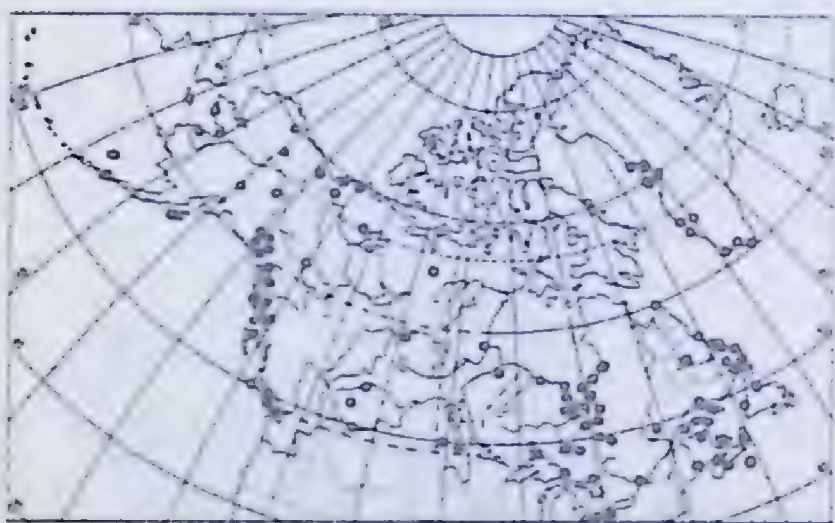
8. *Potamogeton pectinatus* L.



9. *Potamogeton Richardsonii* (Benn.) Rydb.



10. *Danthonia intermedia* Vasey



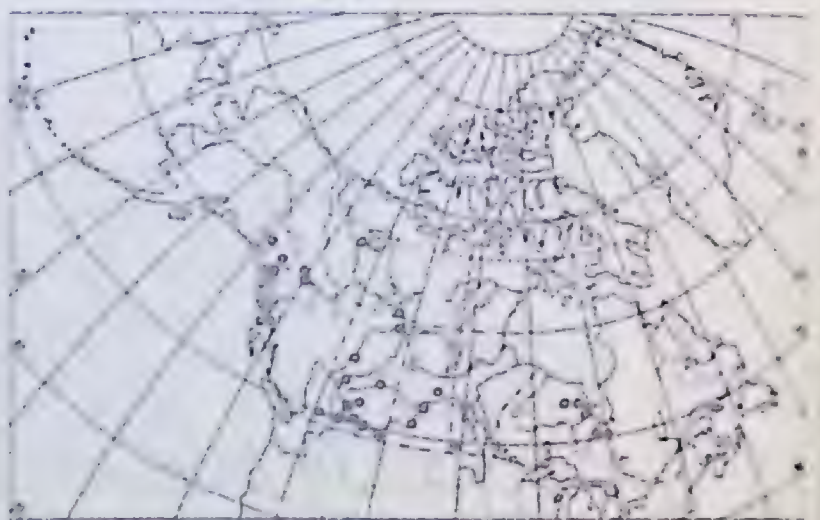
11. *Festuca rubra* L. s.str.



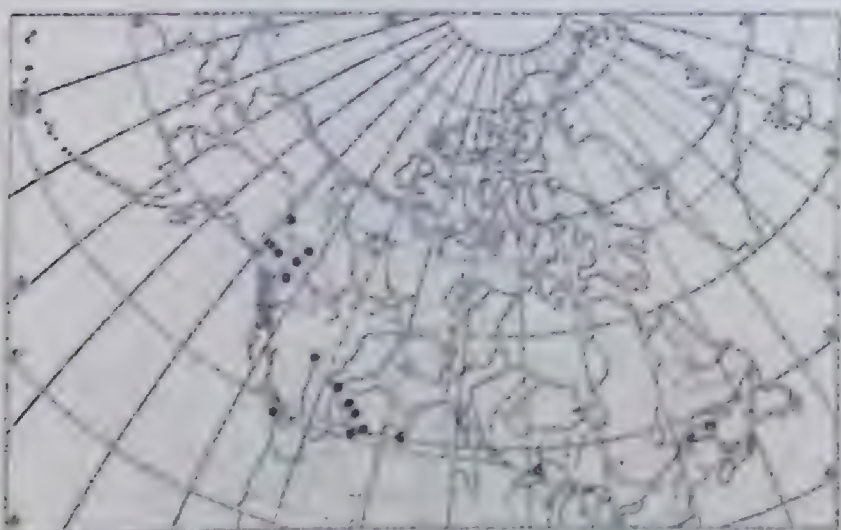
12. A. *Festuca vivipara* (L.) Sm. (dots)
B. *F. prolifera* (Piper) Fern. var. *lasiolepis* Fern. (rings)



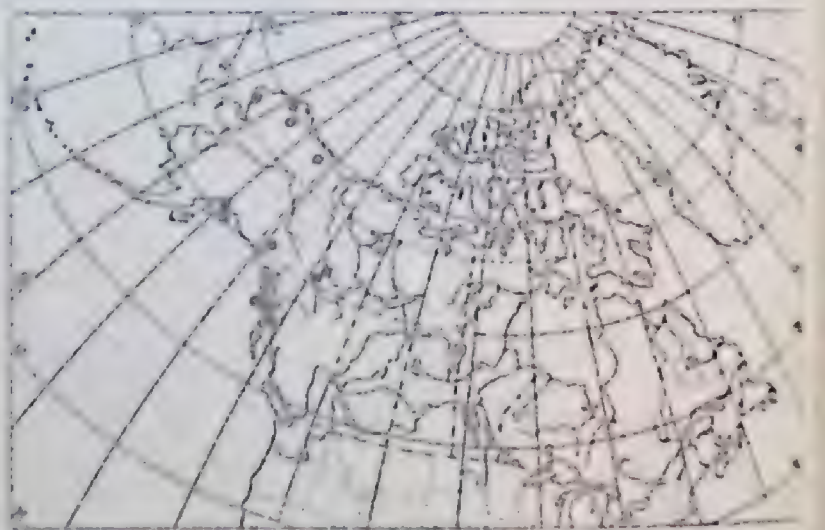
13. *Glyceria pulchella* (Nash) Schum.



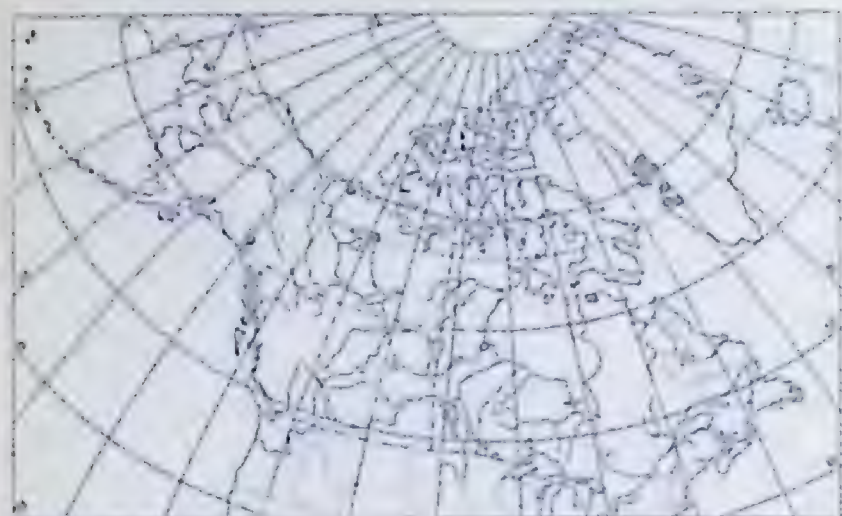
14. *Muhlenbergia Richardsonis* (Trin.) Rydb.



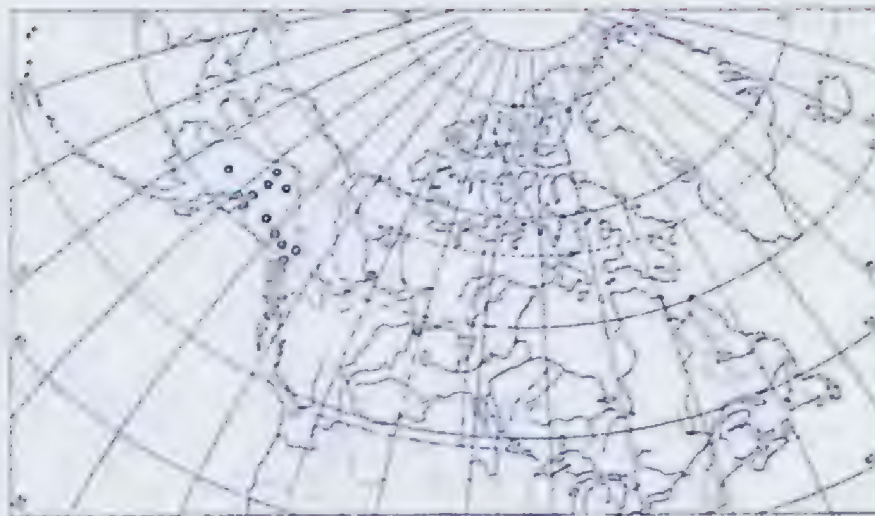
15. *Poa Canbyi* (Scribn.) Piper



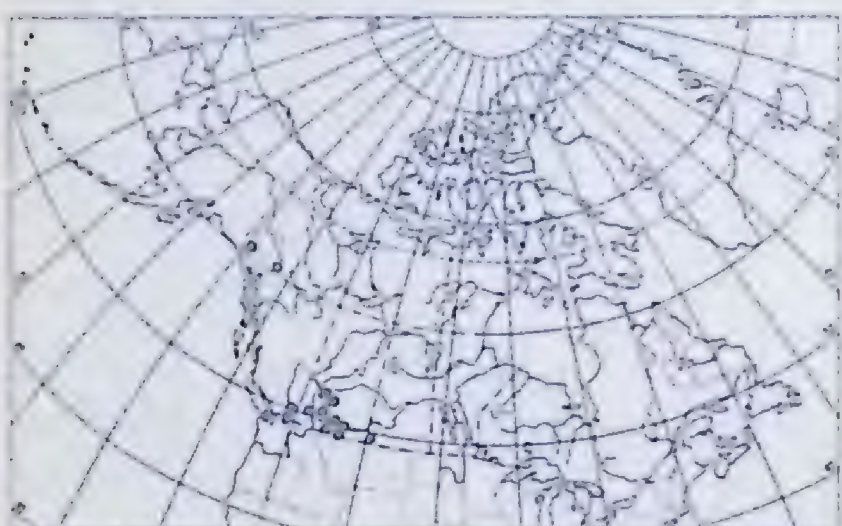
16. *Poa Williamsii* Nash



17. *Puccinellia deschampsioides* Th. Sor.



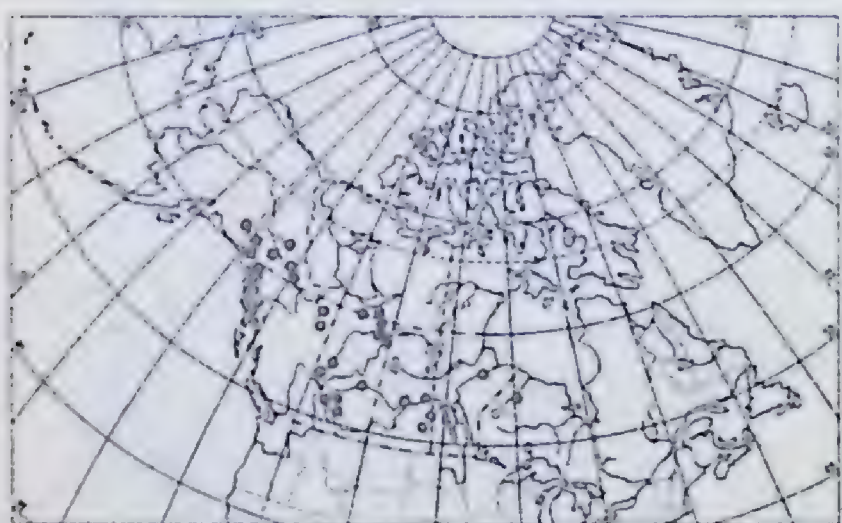
18. *Puccinellia interior* Th. Spr.



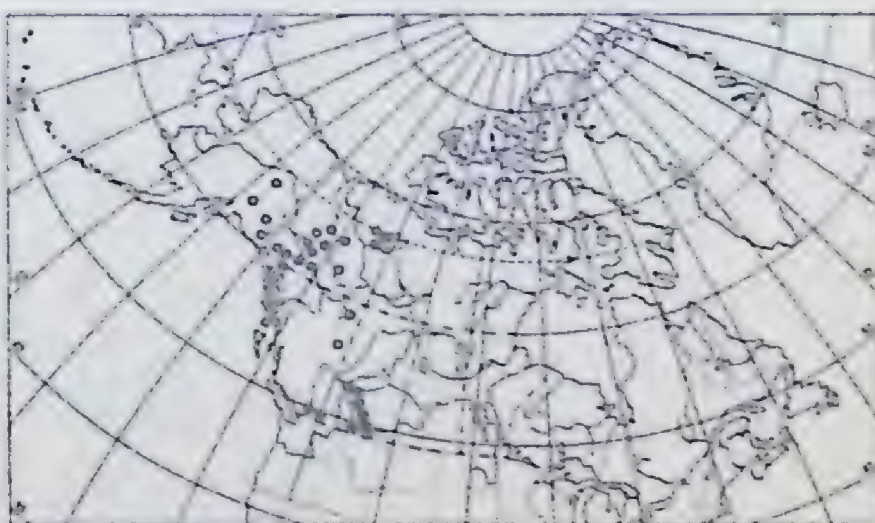
19. *Stipa columbiana* Macoun



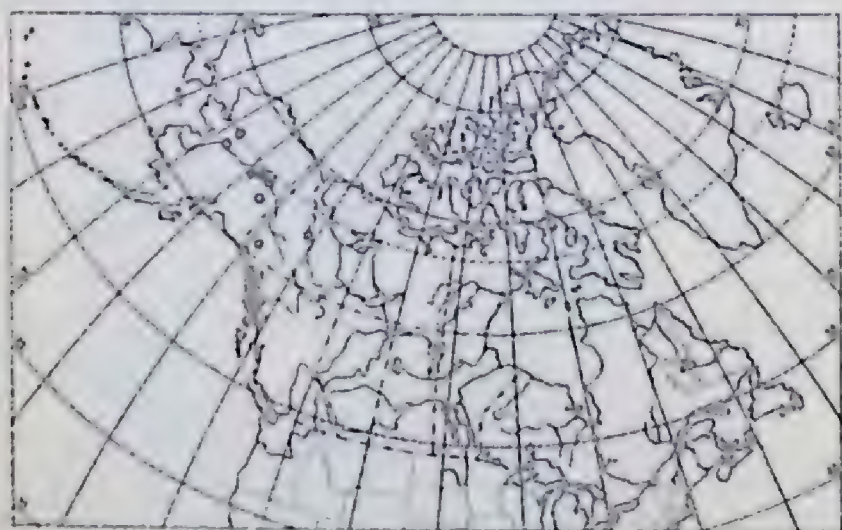
20. *Carex atherodes* Spreng.



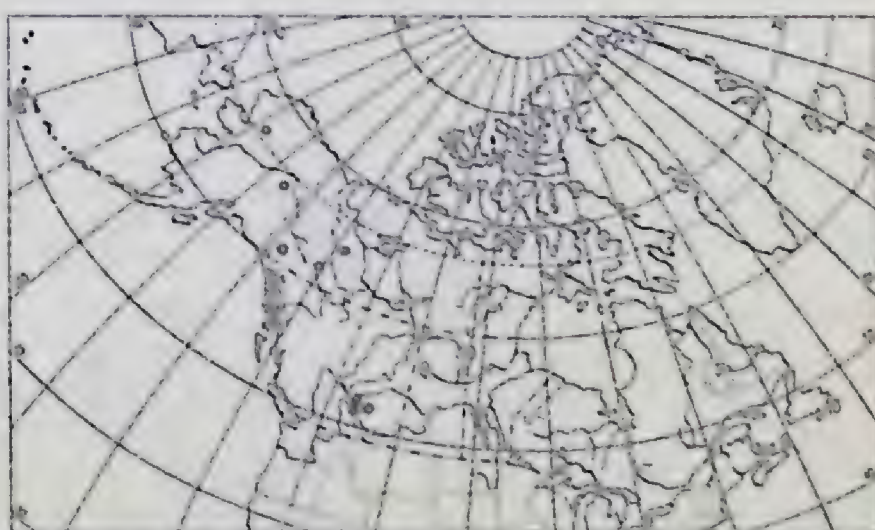
21. *Carex atratiformis* Britt. ssp.
Raymondii (Calder) Porsild



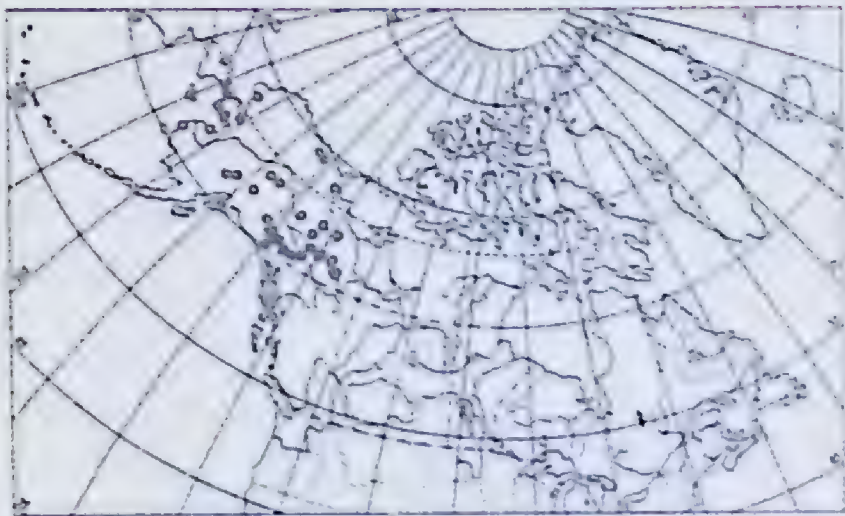
22. *Carex atosquama* Mack.



23. *Carex eleusinoides* Turcz.



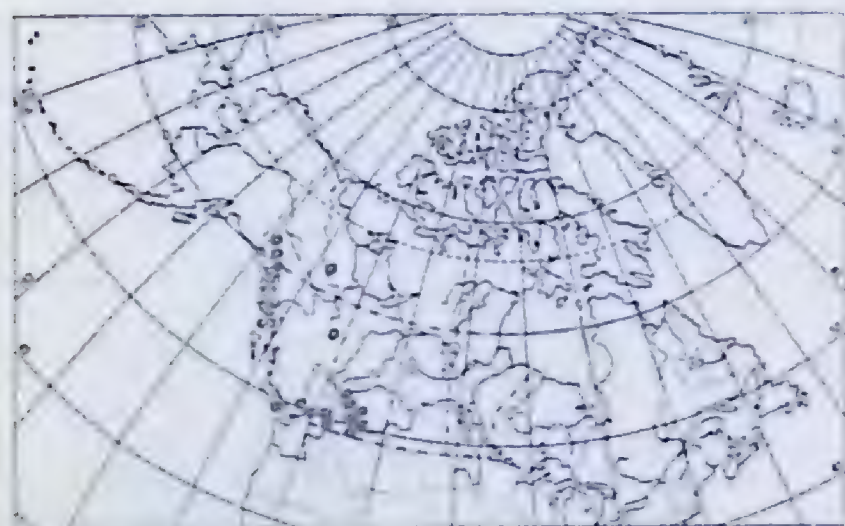
24. *Carex Franklinii* Boott



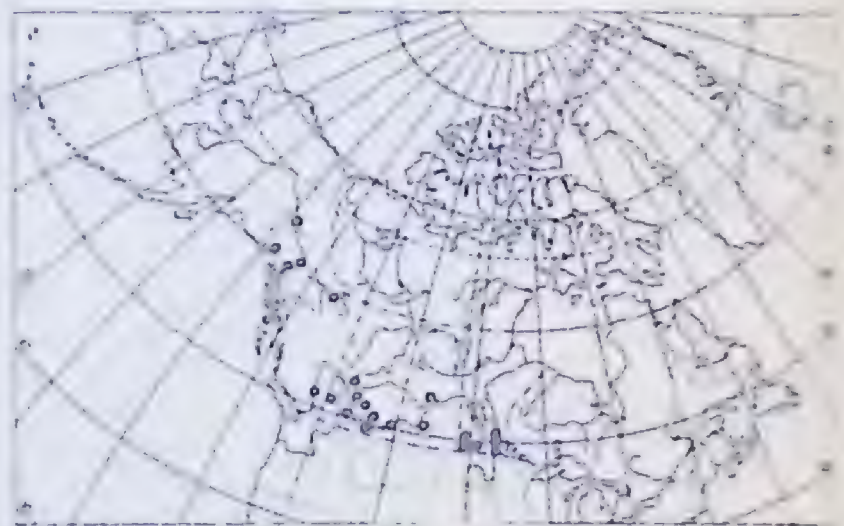
25. *Carex microchaeta* Holm



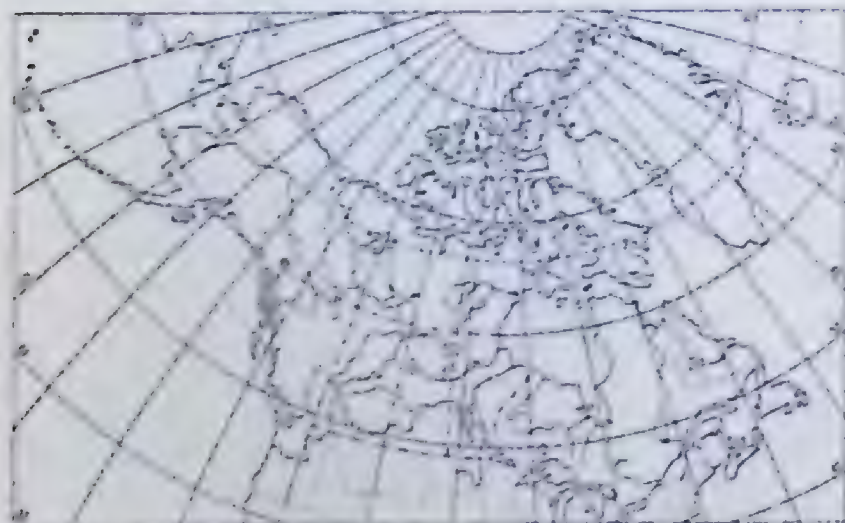
26. *Carex Parryana* Dew.



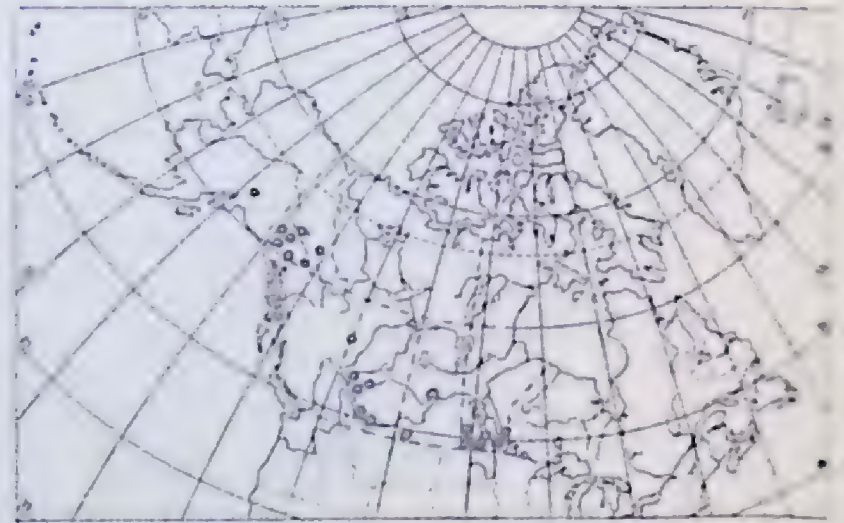
27. *Carex phaeocephala* Piper



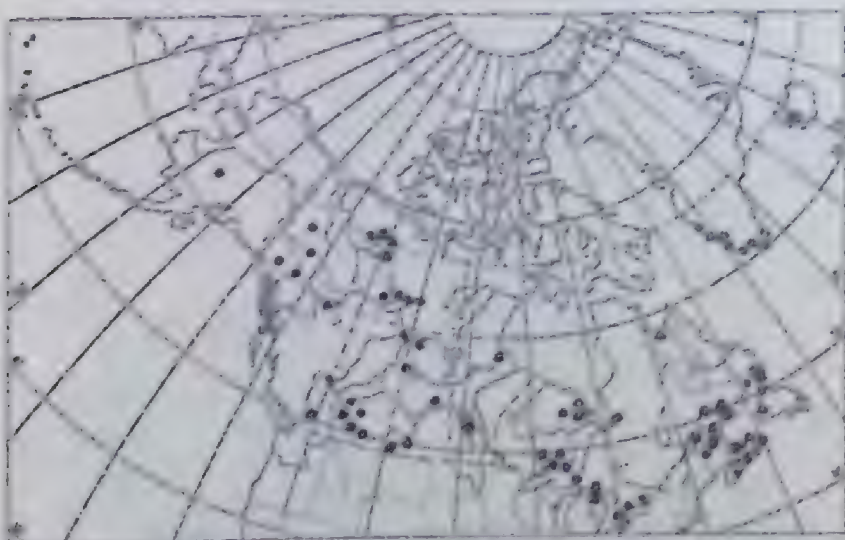
28. *Carex praegracilis* Boott



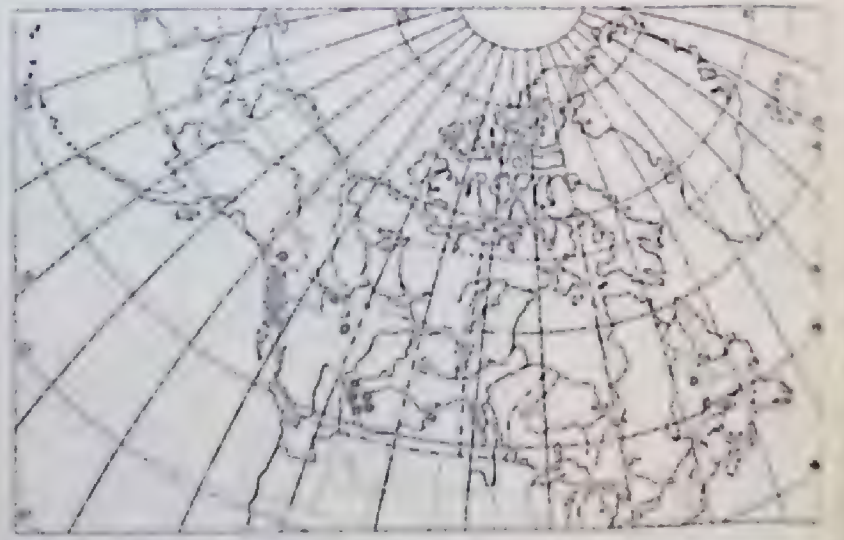
29. *Carex sabulosa* Turcz. ssp.
leiophylla (Mack.) Porsild



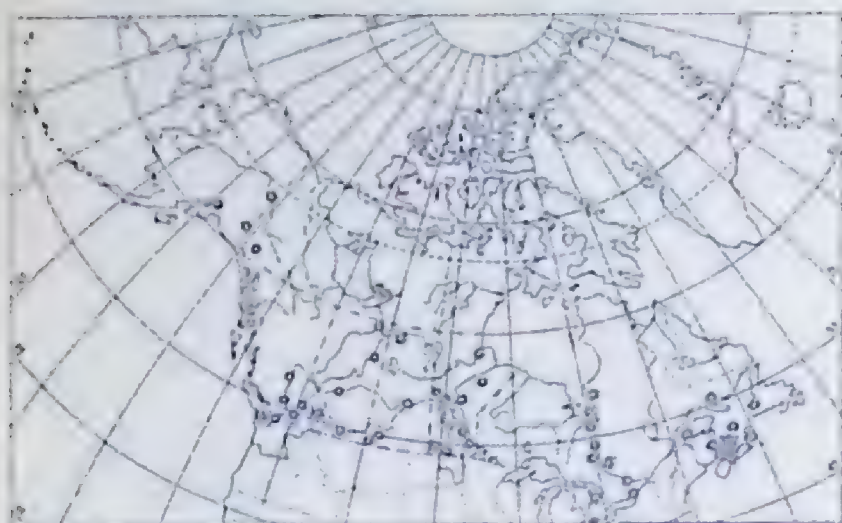
30. *Carex stenophylla* Wahlenb. ssp.
Eleocharis (Bailey) Hult.



31. *Eleocharis pauciflora* (Lightf.) Link



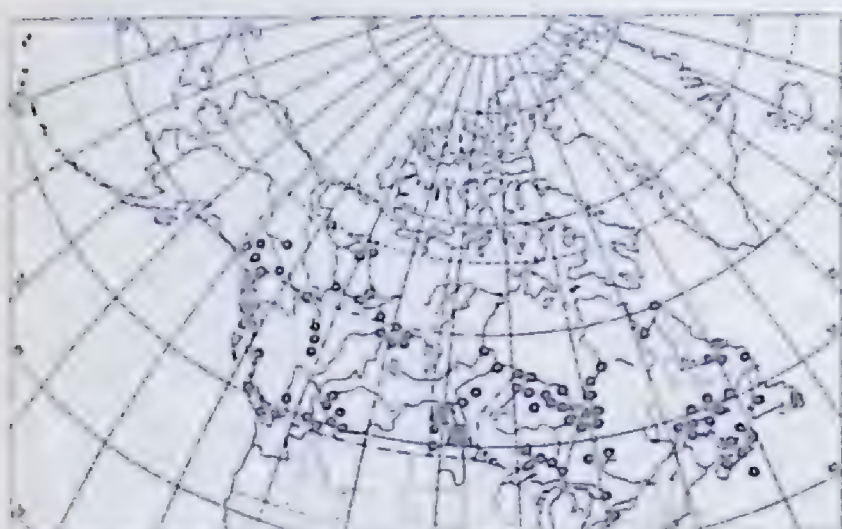
32. *Scirpus Rollandii* Fern.



33. *Lemna minor* L.



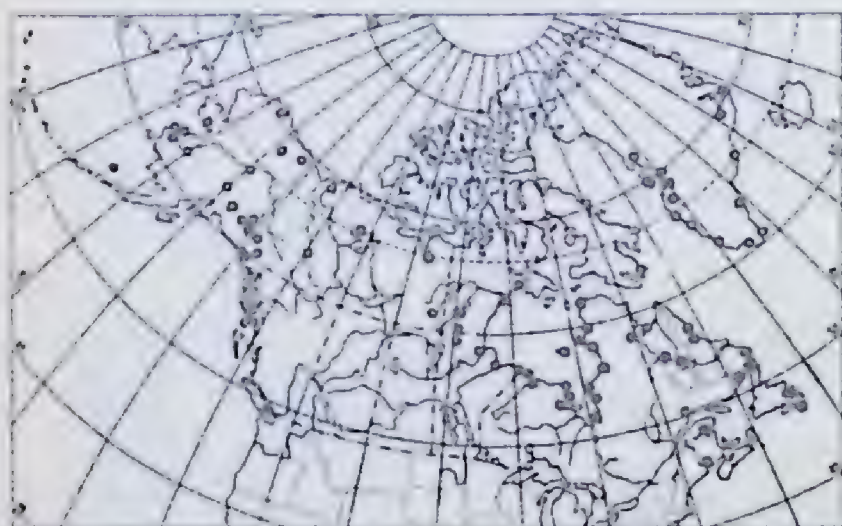
34. *Lemna trisulca* L.



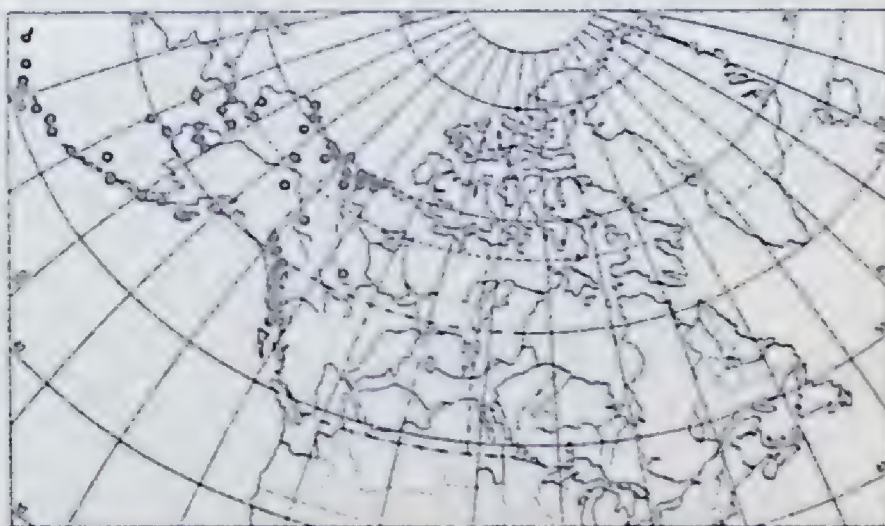
35. *Juncus balticus* Willd. var. *littoralis* Engelm.



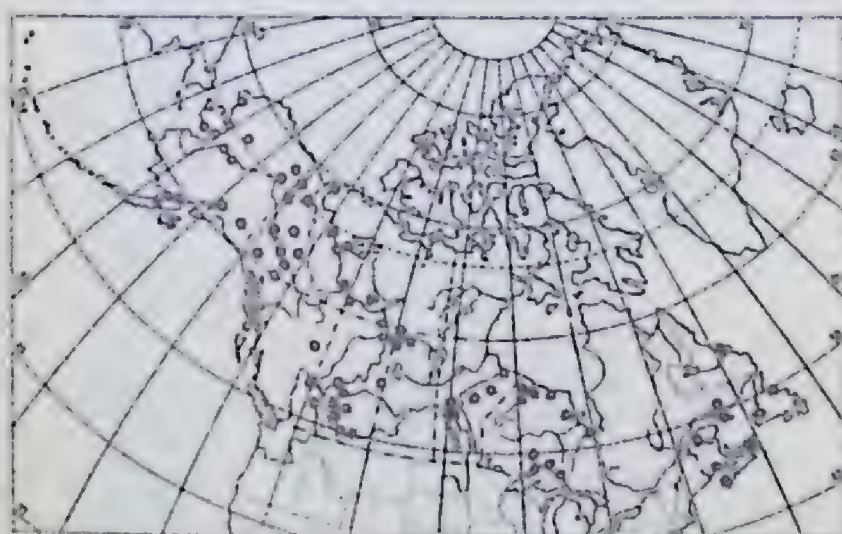
36. *Juncus Drummondii* E. Mey.



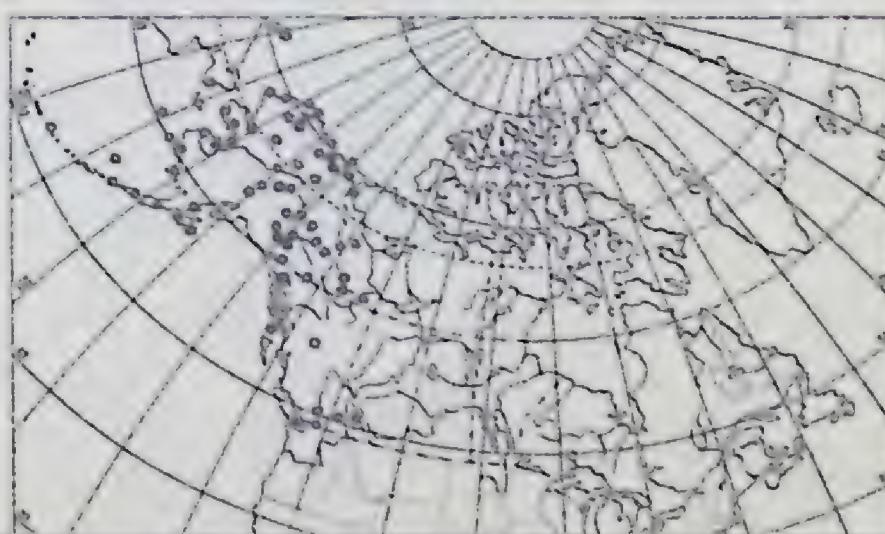
37. *Luzula multiflora* (Retz.) Lej. ssp. *frigida* (Buch.) Krecz.



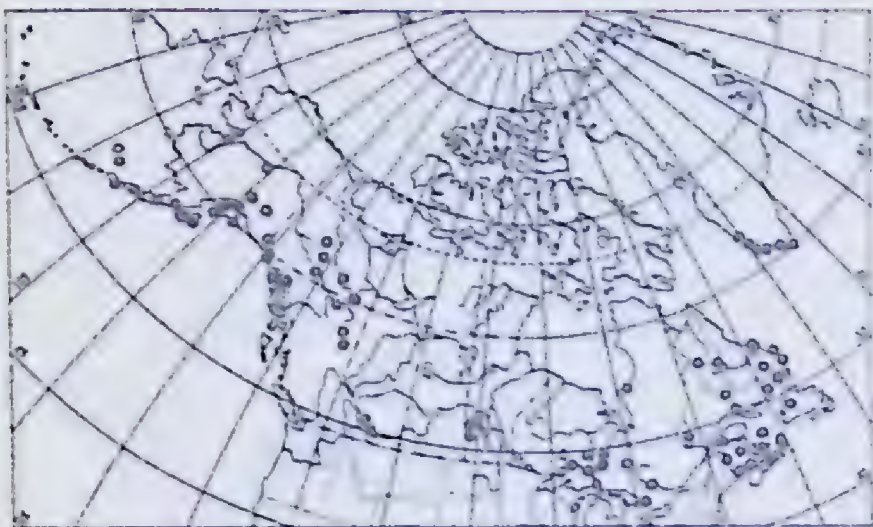
38. *Luzula nivalis* (Laest.) Beurl. var. *latifolia* (Kjellm.) Sam.



39. *Allium Schoenoprasum* L. var. *sibiricum* (L.) Hartm.



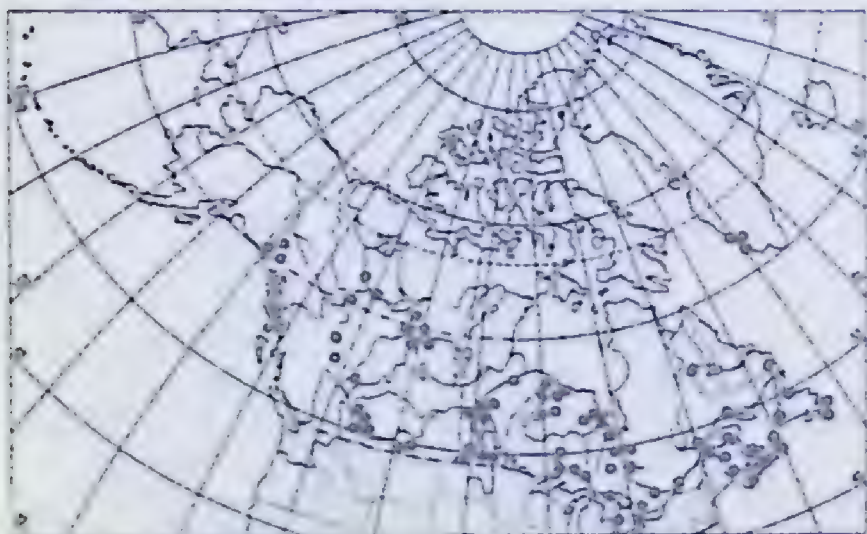
40. *Llyodia serotina* (L.) Rchb.



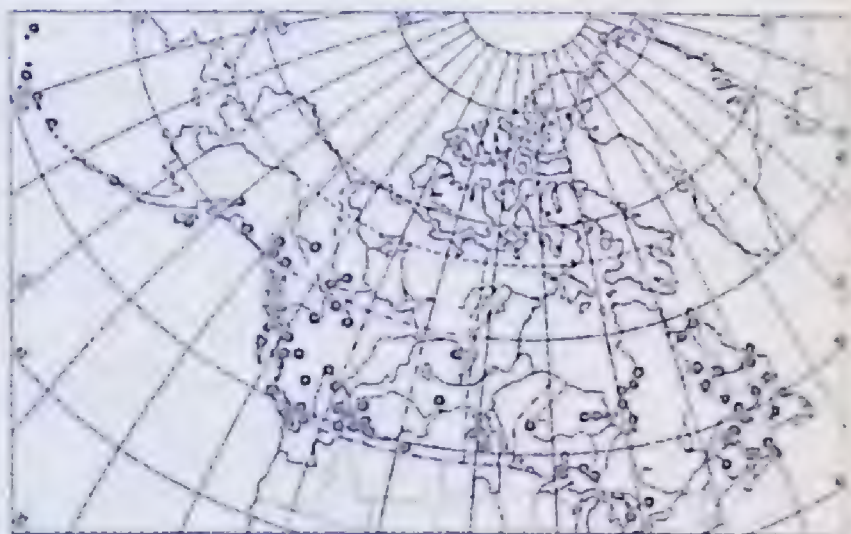
41. *Streptopus amplexifolius* (L.) DC. var. *americanus* Schultes



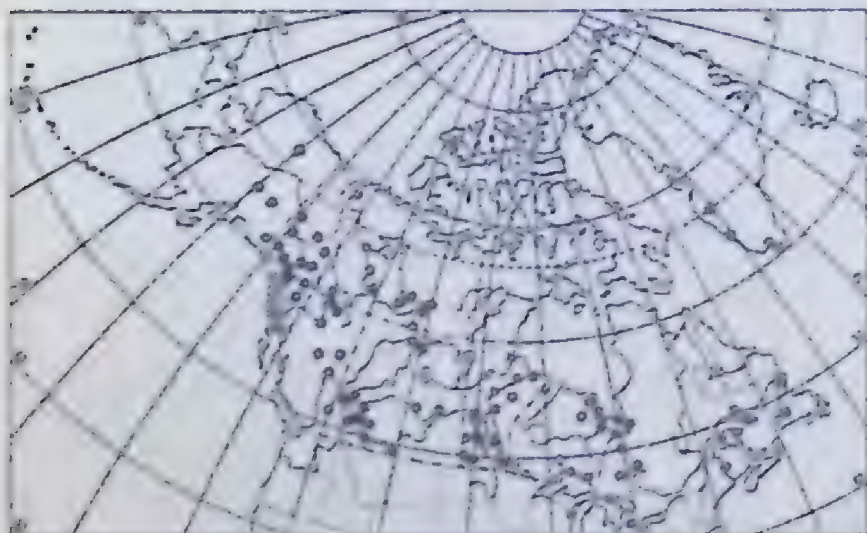
42. *Veratrum Eschscholtzii* A. Gray



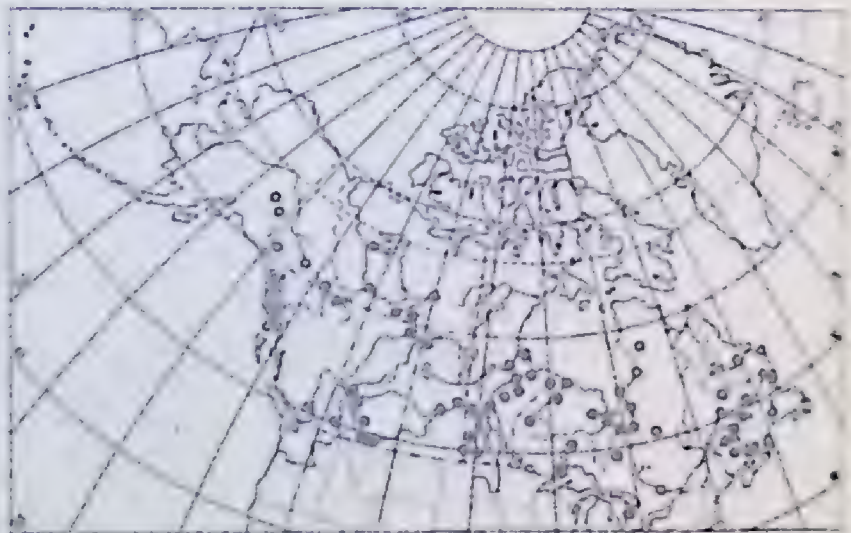
43. *Sisyrinchium angustifolium* Miller



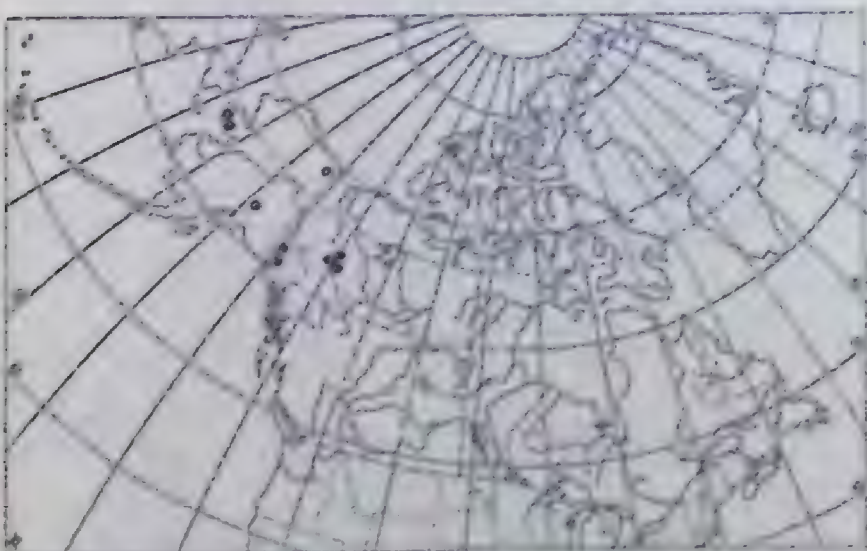
44. *Habenaria dilatata* (Pursh) Hook.



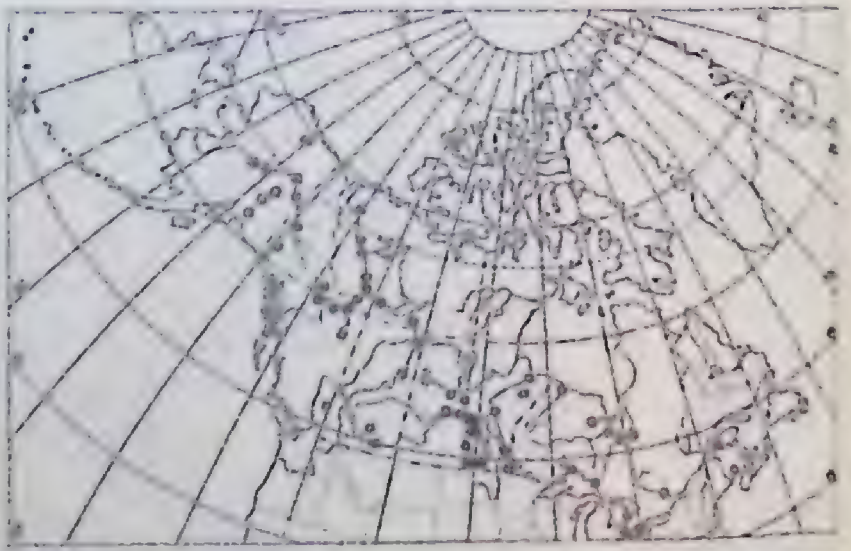
45. *Orchis rotundifolia* Banks



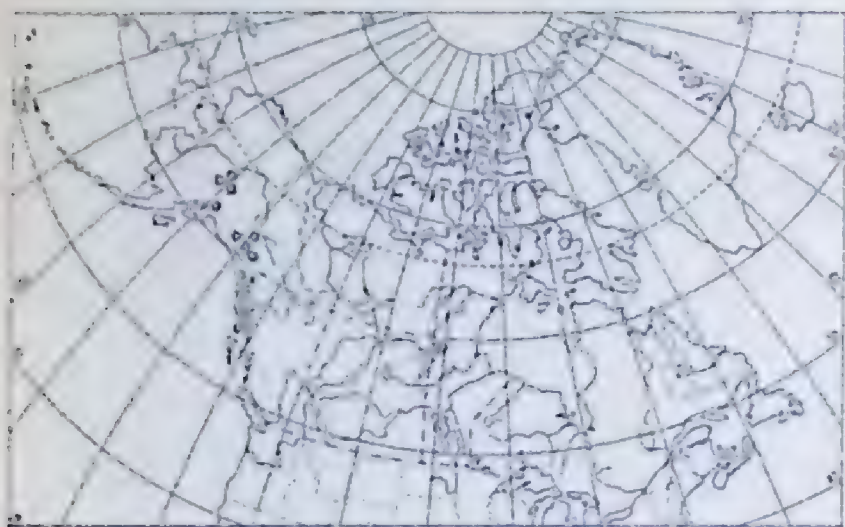
46. *Salix candida* Flügge



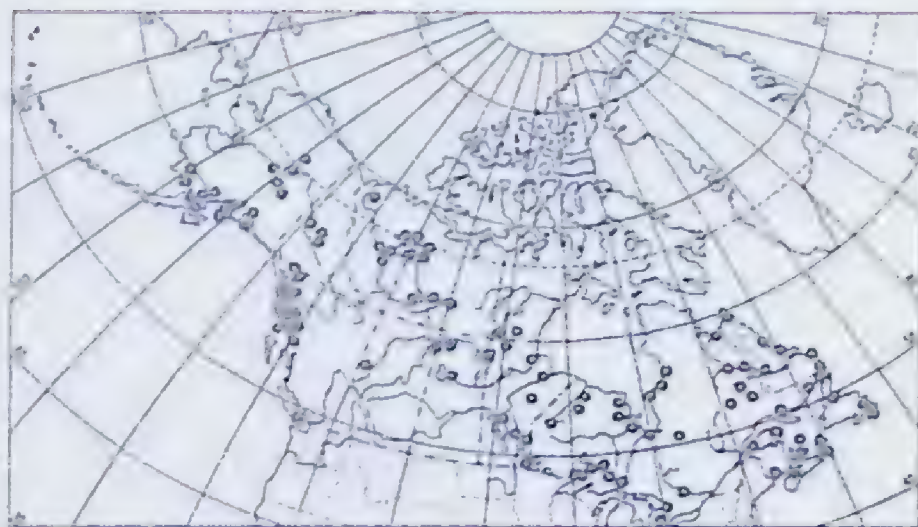
47. *Salix Dodgeana* Rydb.



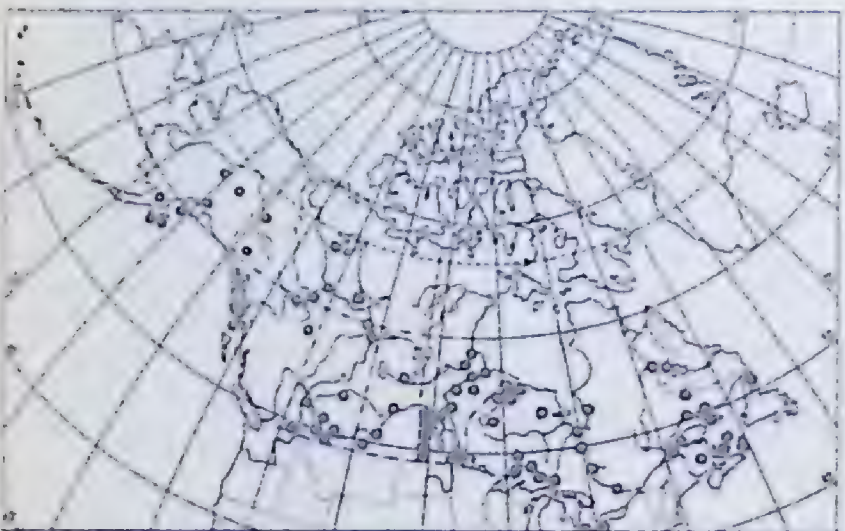
48. *Salix interior* Rowlee var. *pedicellata* (Anders.) Ball



49. *Salix Setchelliana* Ball



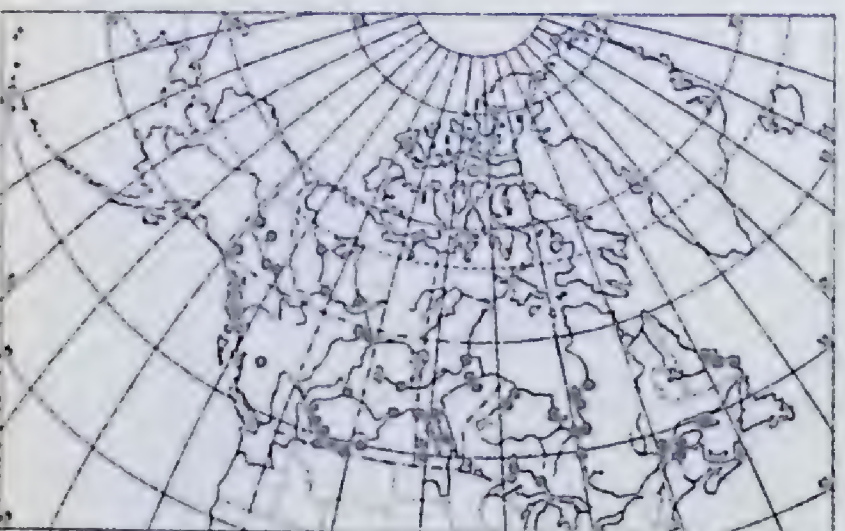
50. *Myrica Gale* L.



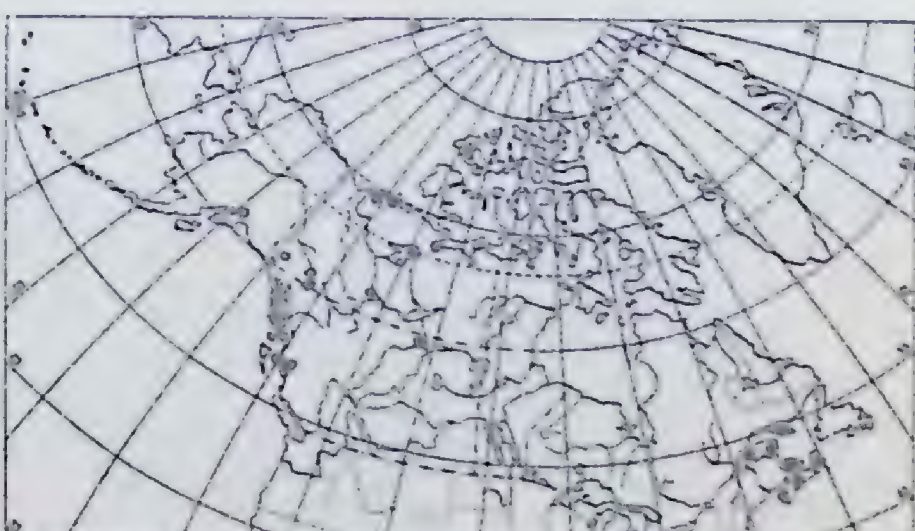
51. *Urtica gracilis* Ait.



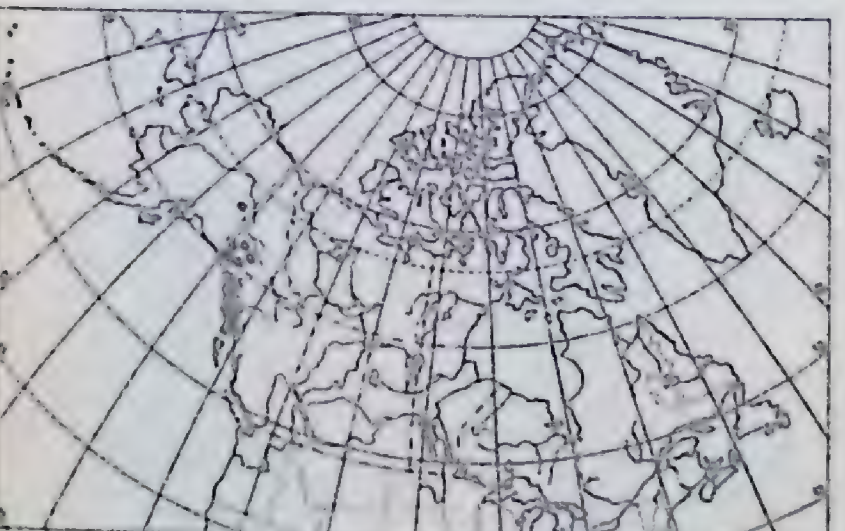
52. *Polygonum alaskanum* (Small) Wight



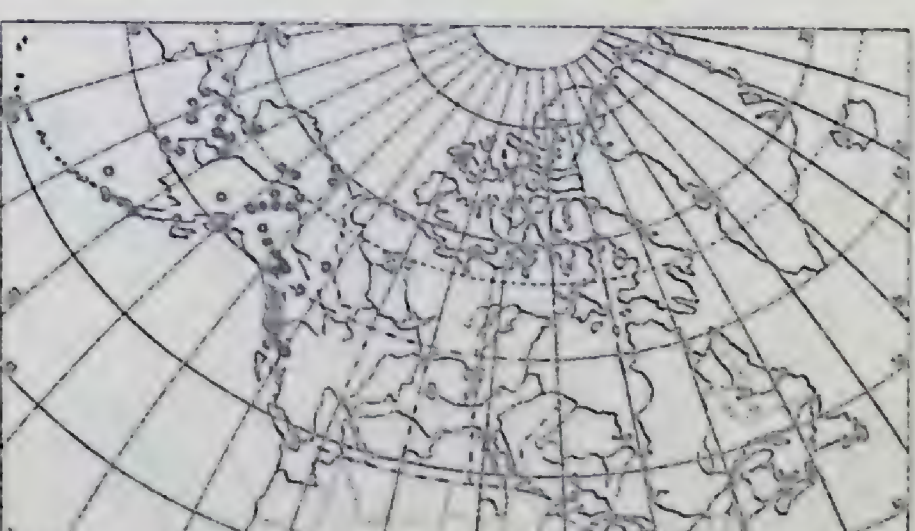
53. *Rumex occidentalis* Wats.



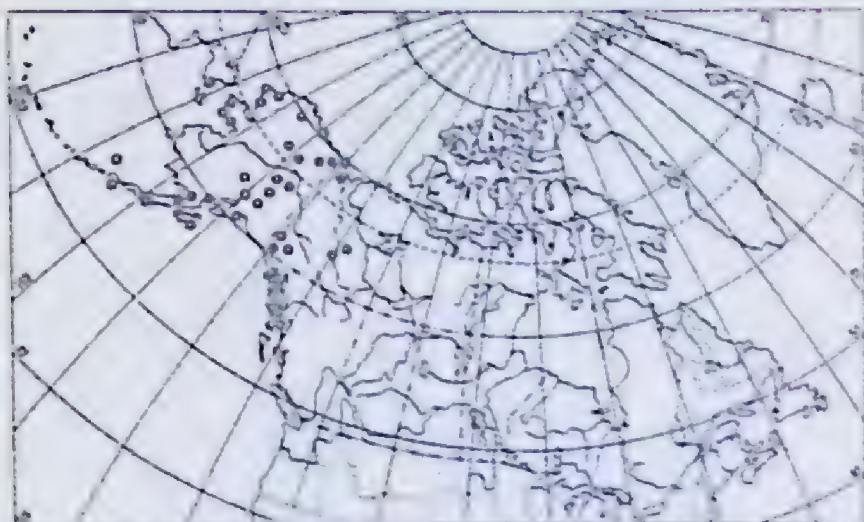
54. *Suaeda maritima* (L.) Dumort



55. *Claytonia Bastockii* Porsild



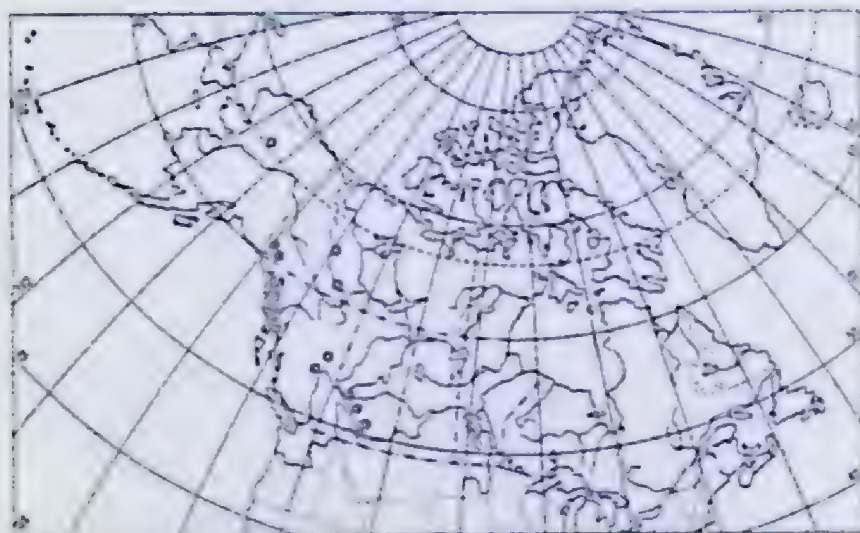
56. *Claytonia sarmentosa* C.A. Mey.



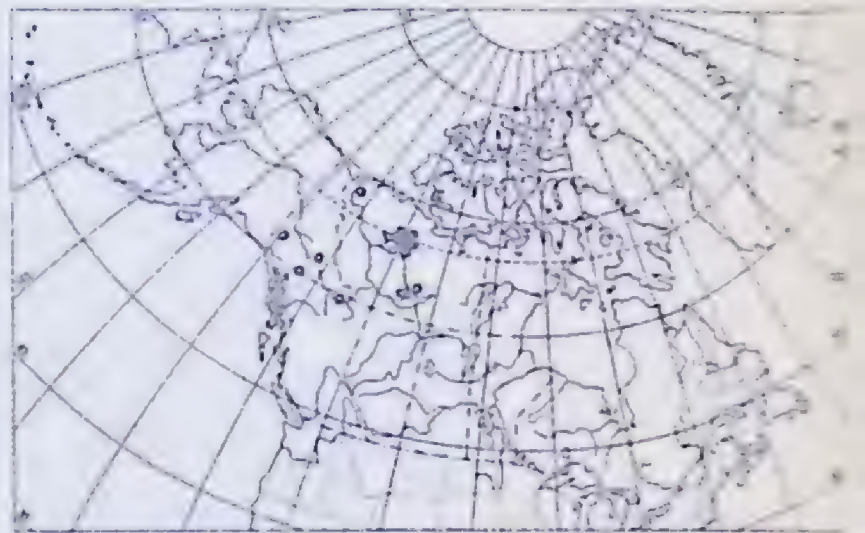
57. *Arenaria macrocarpa* Pursh



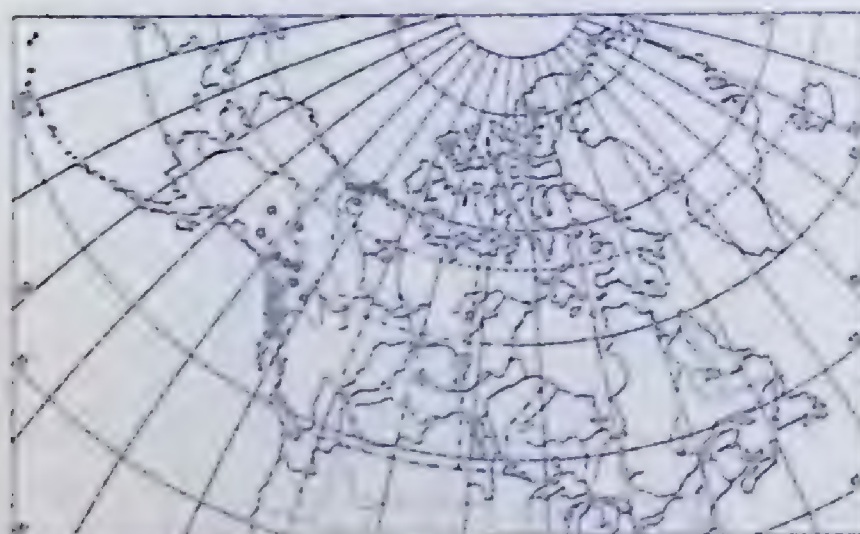
58. *Arenaria obtusiloba* (Rydb.) Fern.



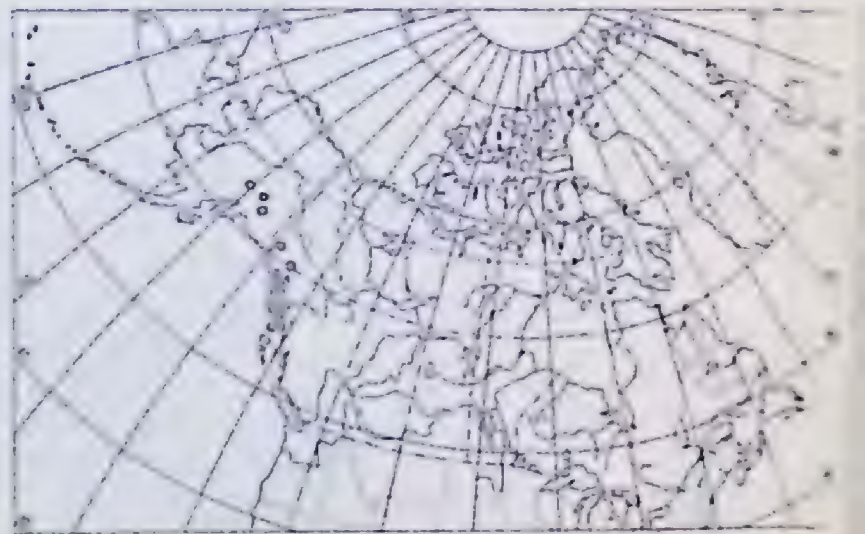
59. *Melandrium apetalum* (L.) Fenzl. ssp. *attenuatum* (Farr) Hara



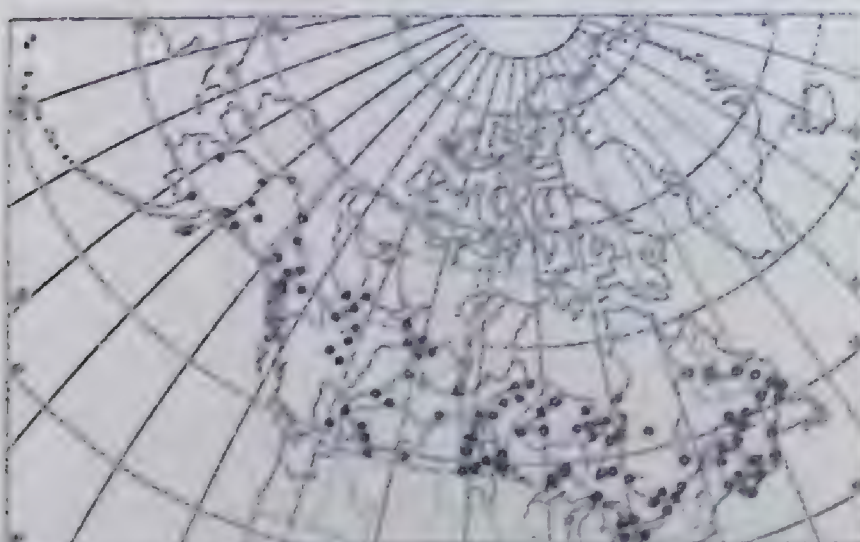
60. *Melandrium Ostenfeldii* Porsild



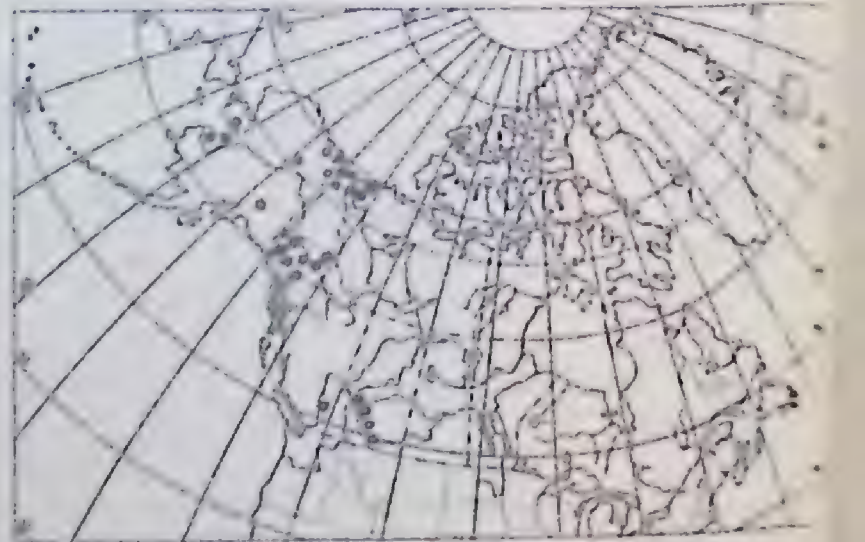
61. *Melandrium taimyrense* Tolm.



62. *Stellaria alaskana* Hult.



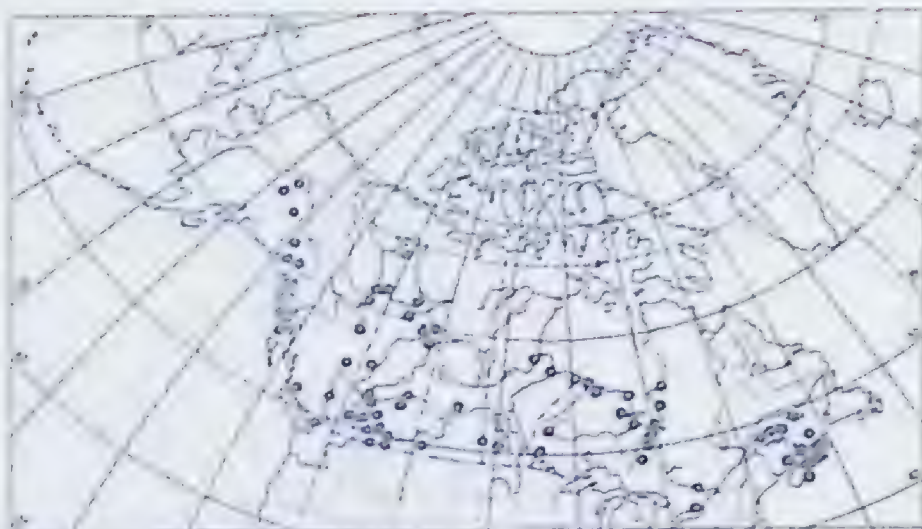
63. *Actaea rubra* Ait.



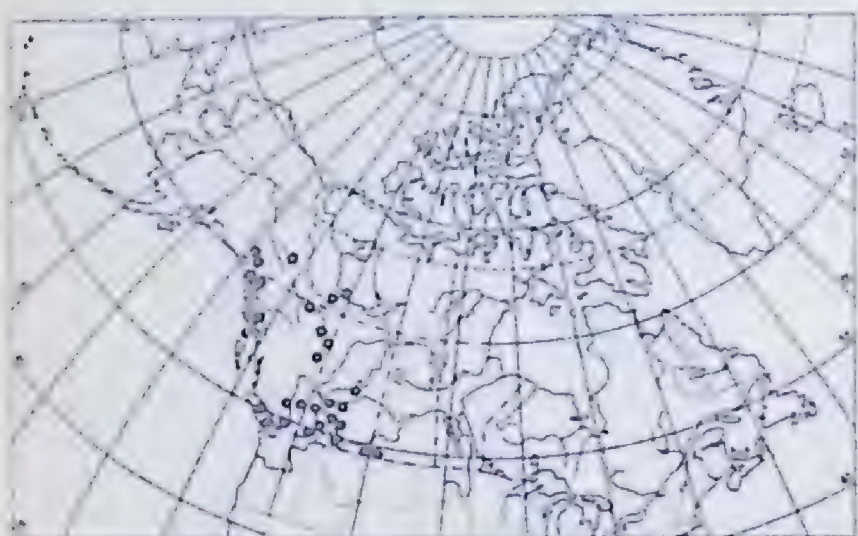
64. *Anemone Drummondii* S. Wats.



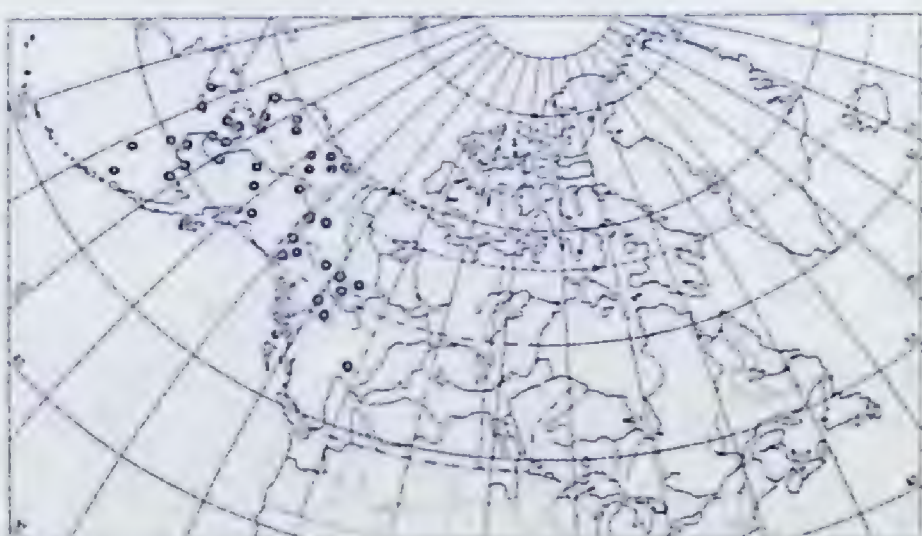
65. *Ranunculus gelidus* Karel. & Kiril.



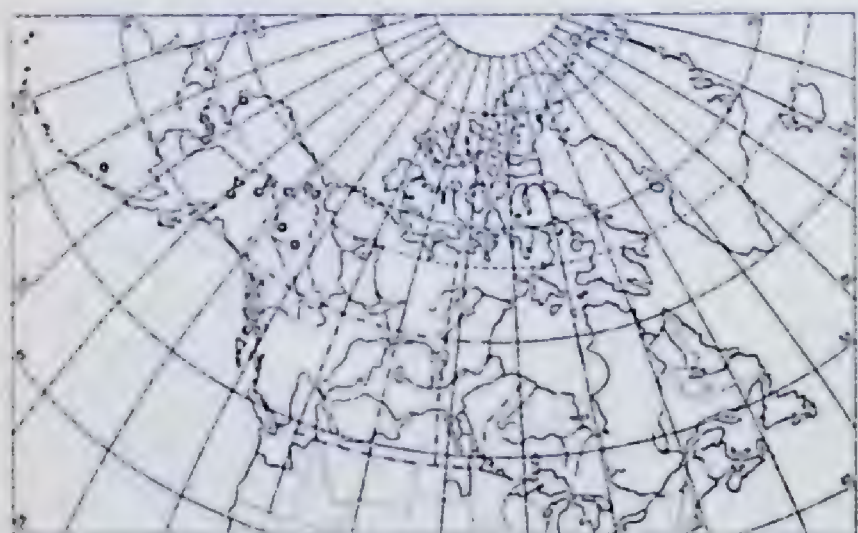
66. *Ranunculus Purshii* Richards.



67. *Thalictrum occidentale* Gray



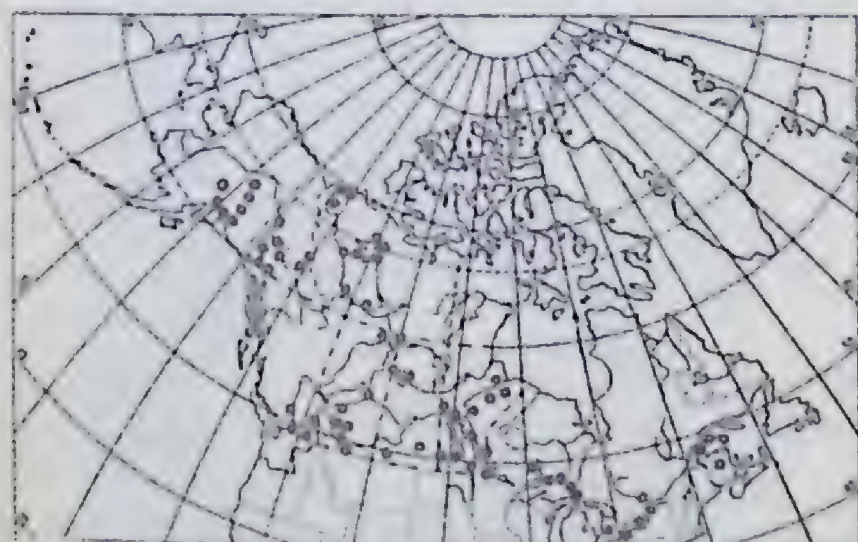
68. *Corydalis pauciflora* (Steph.) Pers.



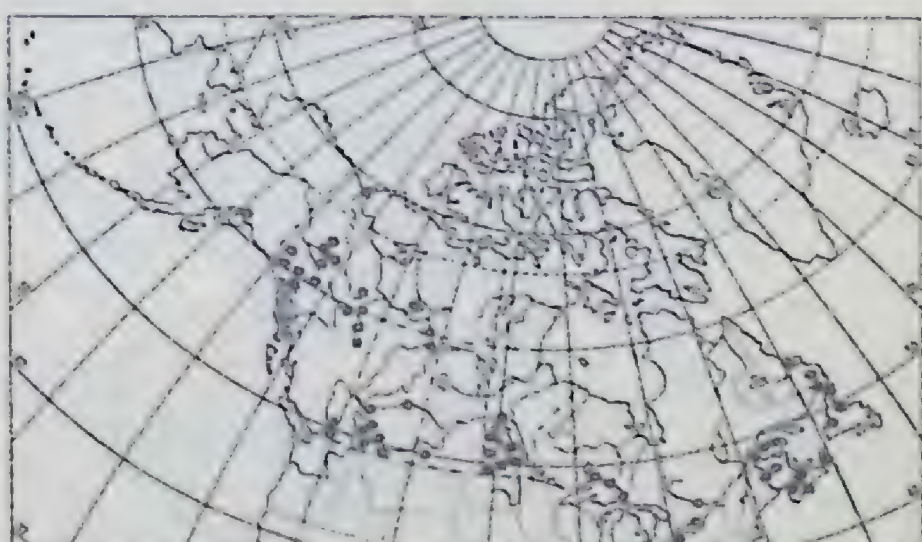
69. A. *Papaver Macounii* Greene (dots)
B. *P. McConnellii* Hult. (triangles)



70. *Alyssum americanum* Greene



71. *Arabis divaricarpa* A. Nels.



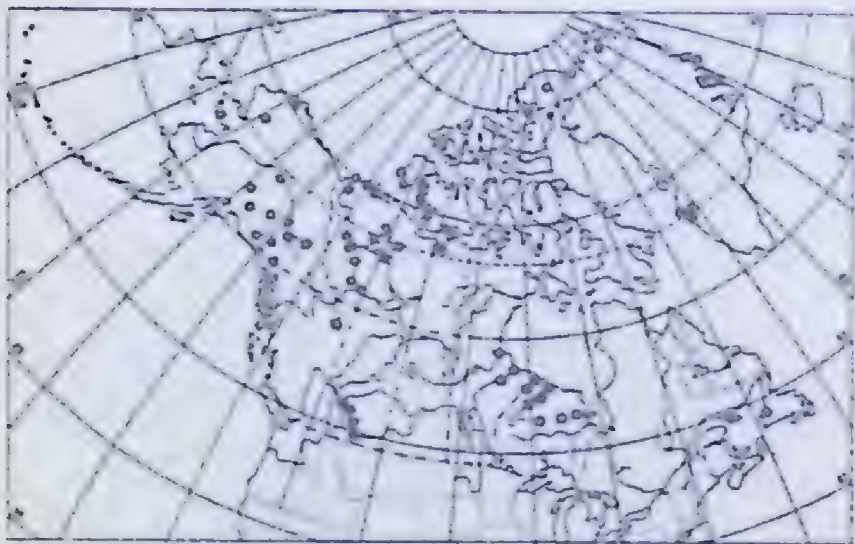
72. *Arabis Drummondii* A. Gray



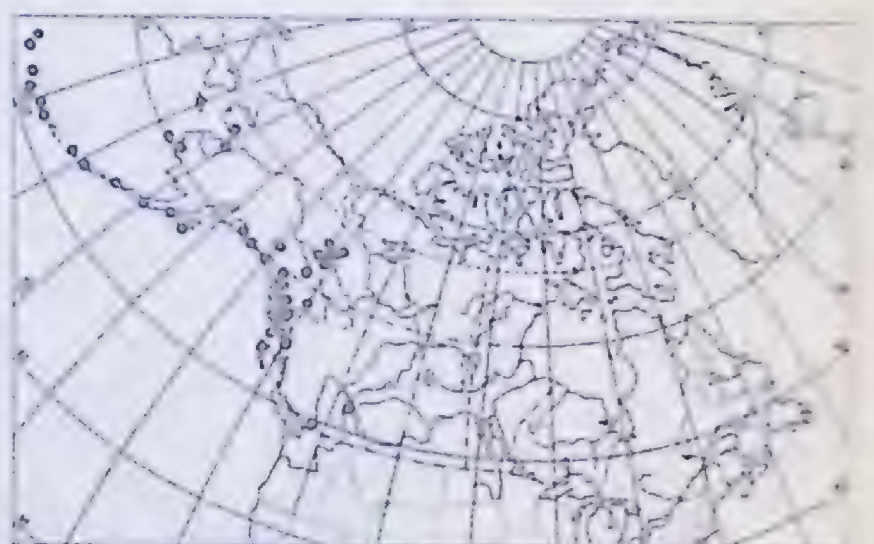
73. *Arabis hirsuta* (L.) Scop. var. *pycnocarpa* (Hopkins) Hult.



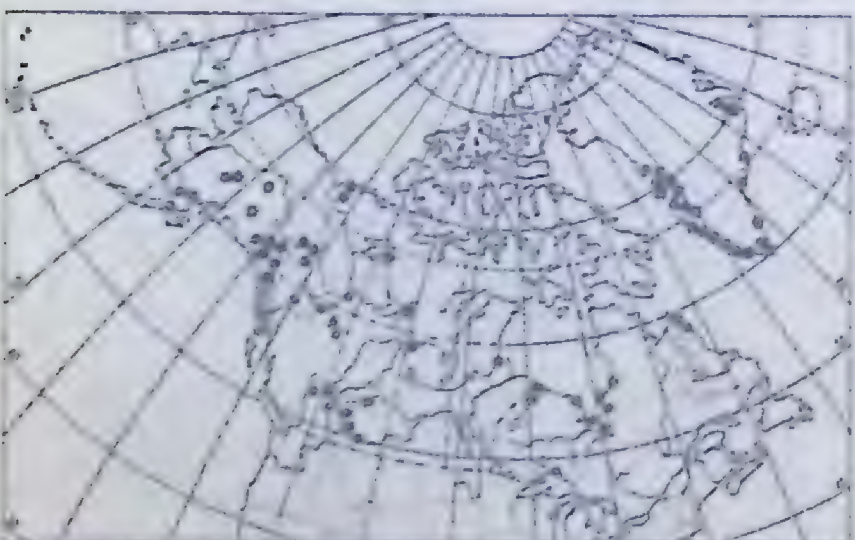
74. *Arabis Lemmonii* S. Wats.



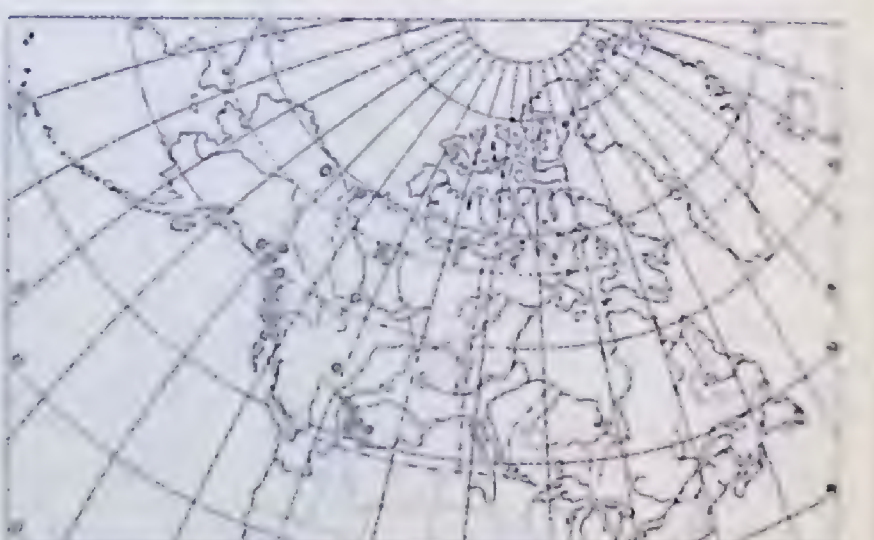
75. *Braya humilis* s. lat.



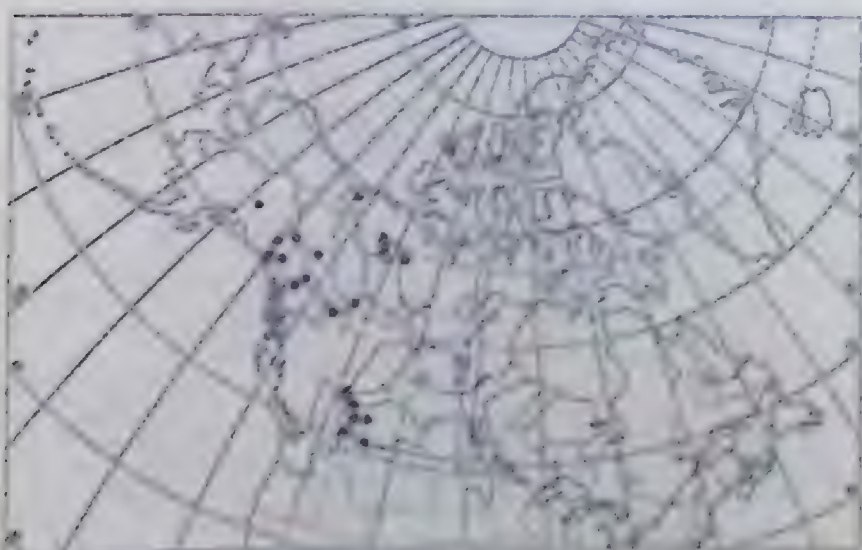
76. *Cardamine umbellata* Greene



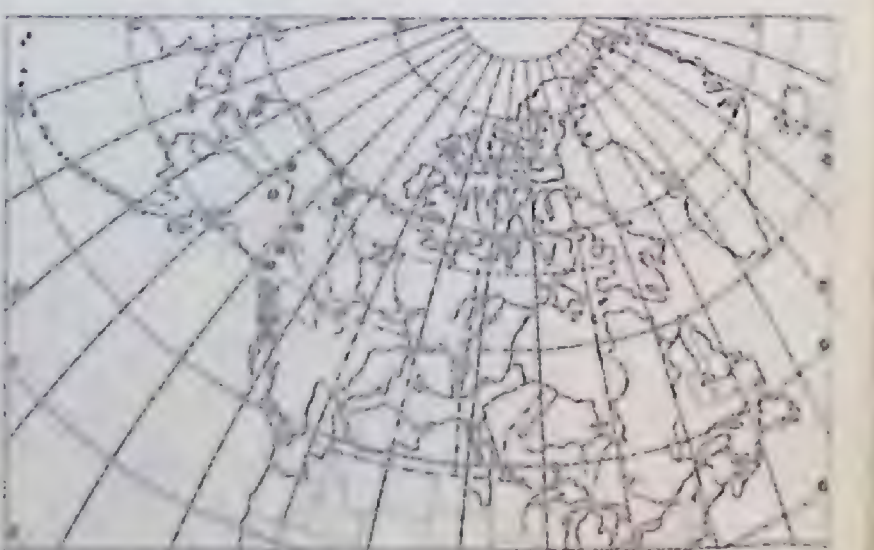
77. *Draba aurea* M. Vahl



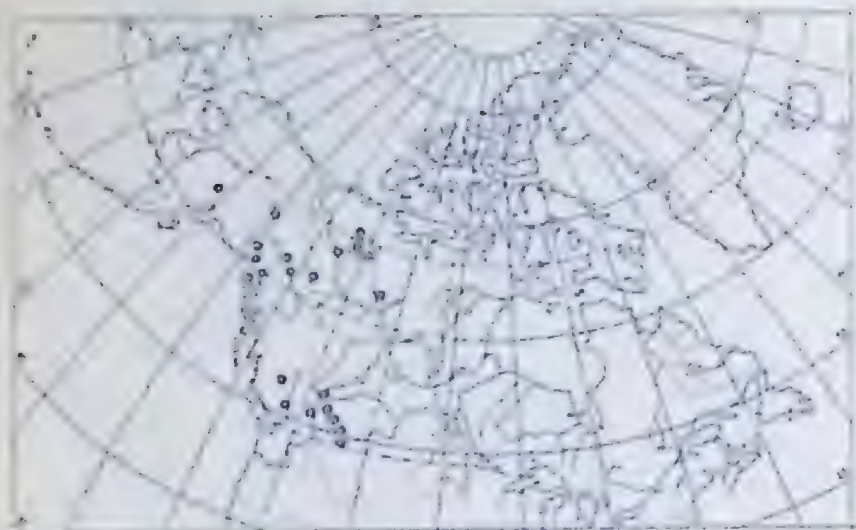
78. *Draba incerta* Payson



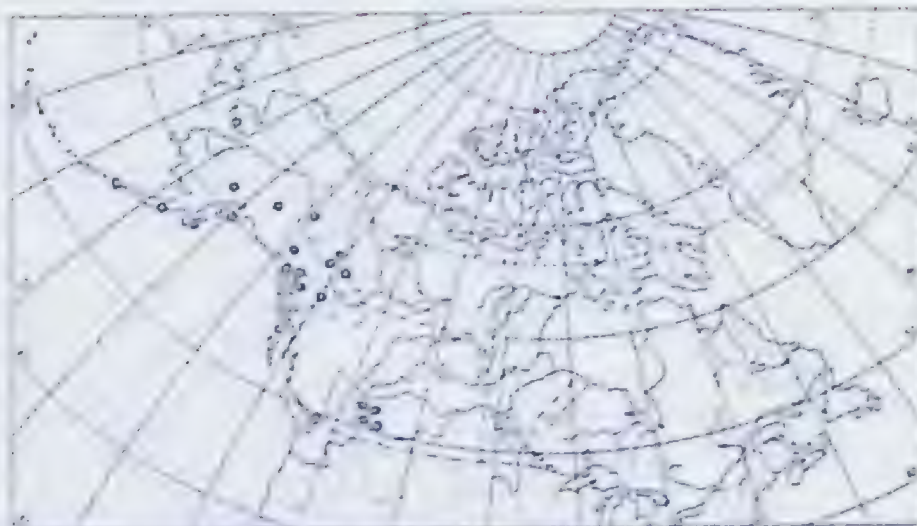
79. *Draba oligosperma* Hook.



80. *Draba Palanderiana* Kjellm.



81. *Draba praealta* Greene



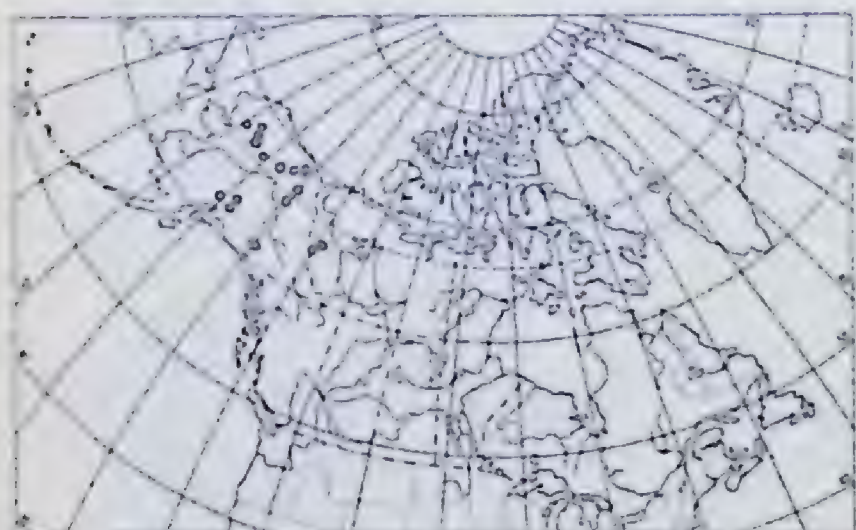
82. *Draba stenoloba* Ledeb.



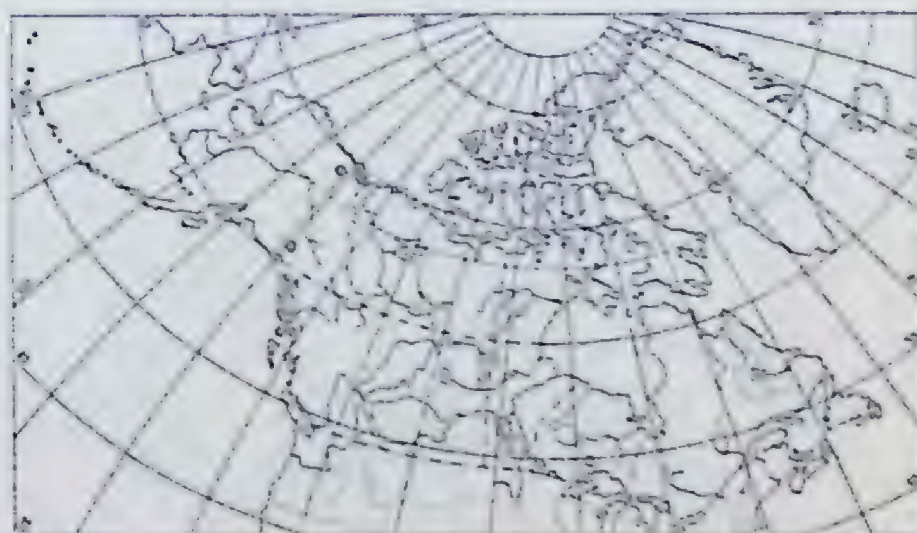
83. *Draba stenopetala* Trautv.



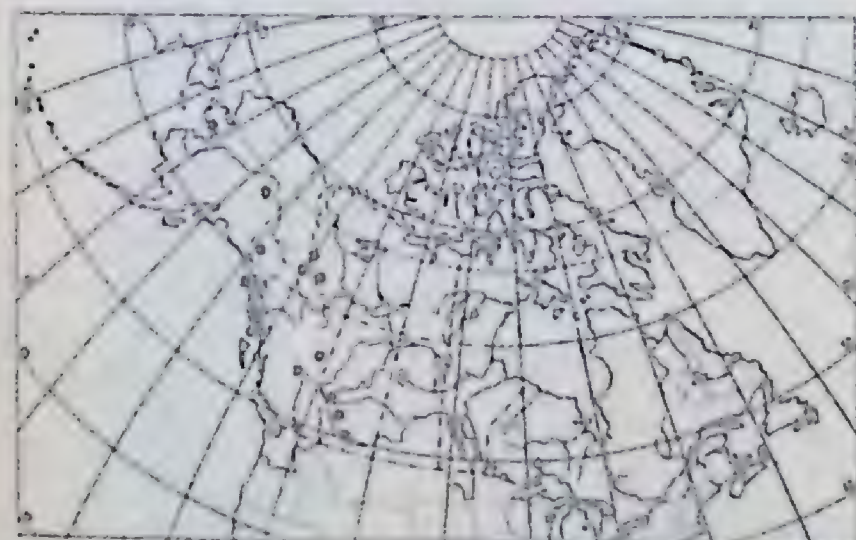
84. *Rorippa barbareaefolia* (DC.) Kittagawa



85. *Smelowskia borealis* (Greene) Drury & Rollins s. lat.



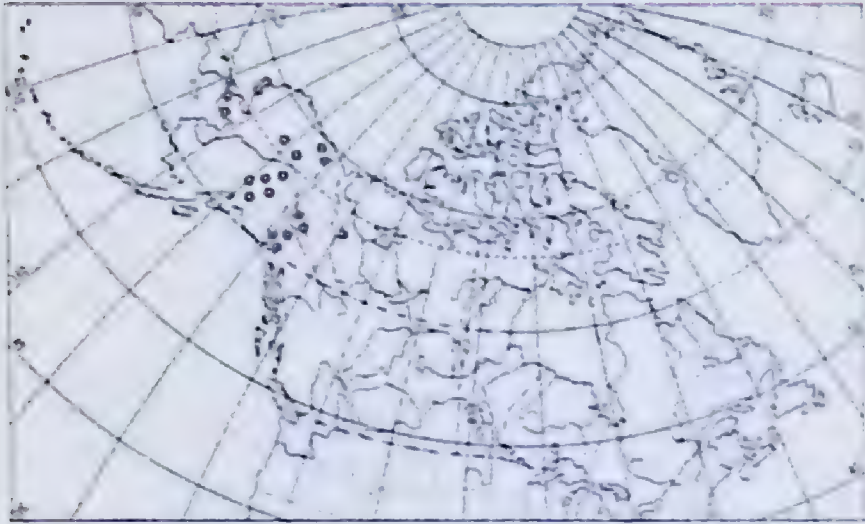
86. *Thlaspi arcticum* Porsild



87. *Saxifraga adscendens* L. ssp. *oregonensis* (Raf.) Bacigalupi



88. *Saxifraga caespitosa* L. ssp. *monticola* (Small) Porsild



89. *Saxifraga davurica* Willd. ssp. *grandipetala* (E. & I.) Hult.



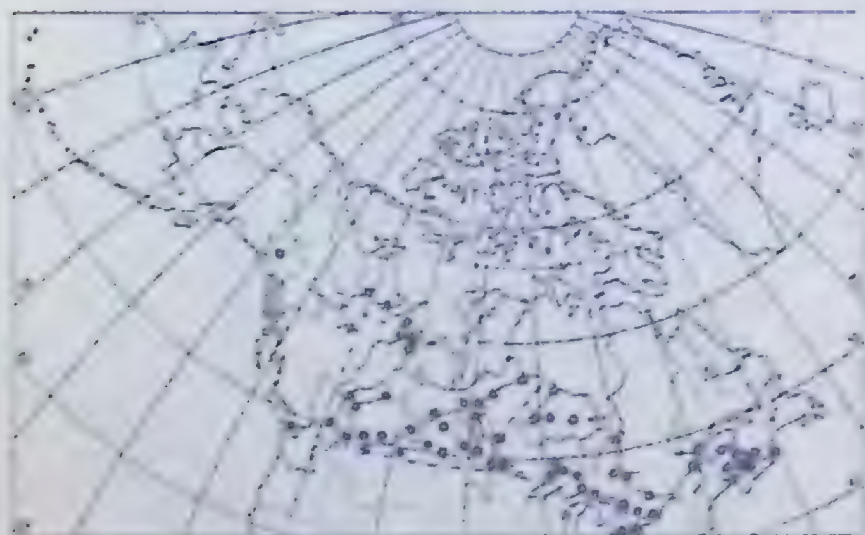
90. *Saxifraga Lyallii* Engler



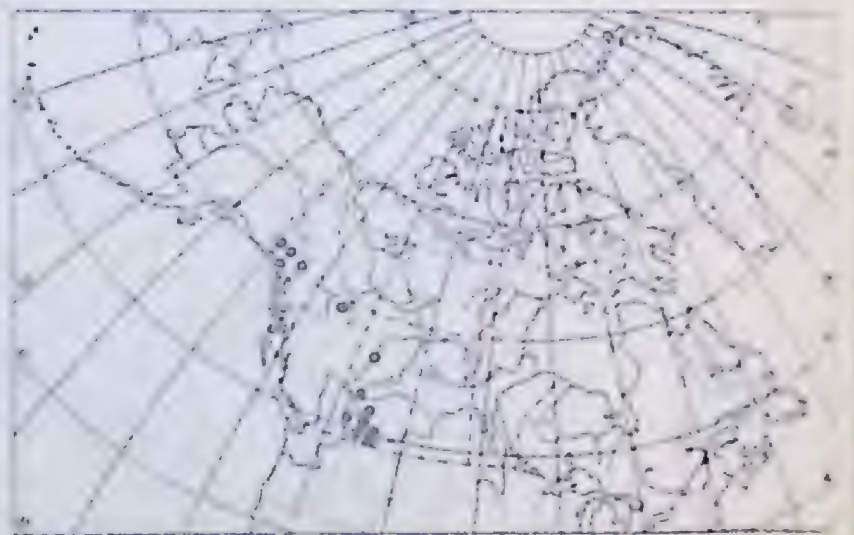
91. *Saxifraga serphyllifolia* Pursh



92. *Dryas alaskensis* Porsild



93. *Geum aleppicum* Jacq. var. *strictum* Ait.



94. *Potentilla arguta* Pursh ssp. *Convallaria* (Rydb.) Keck



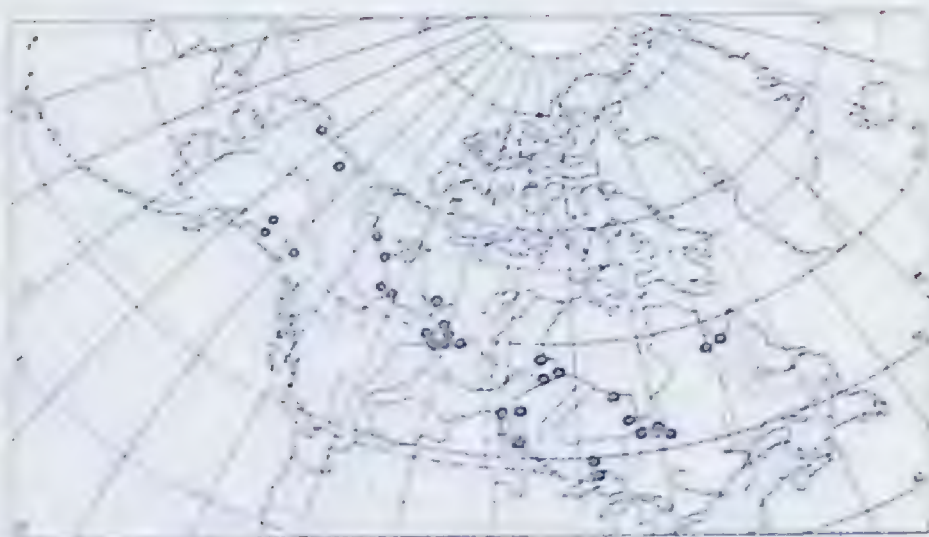
95. *Potentilla biflora* Willd.



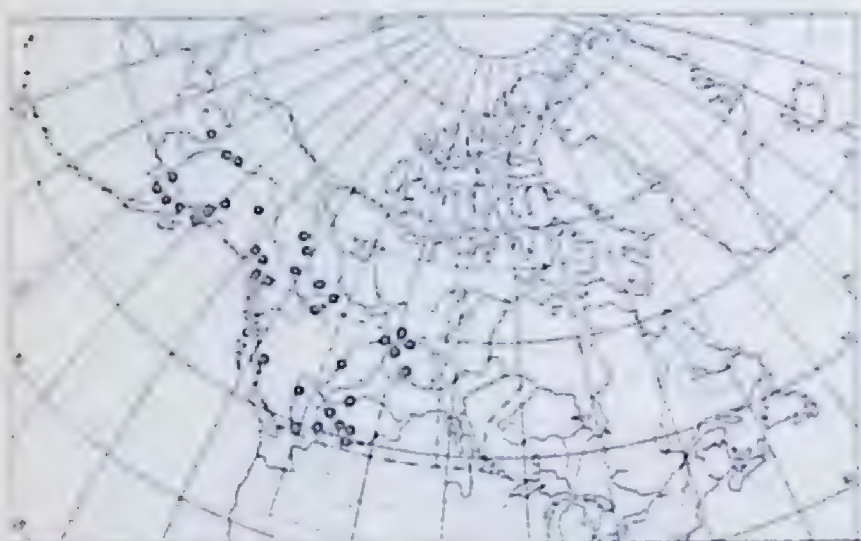
96. *Potentilla furcata* Porsild



97. *Potentilla glabrella* Rydb.



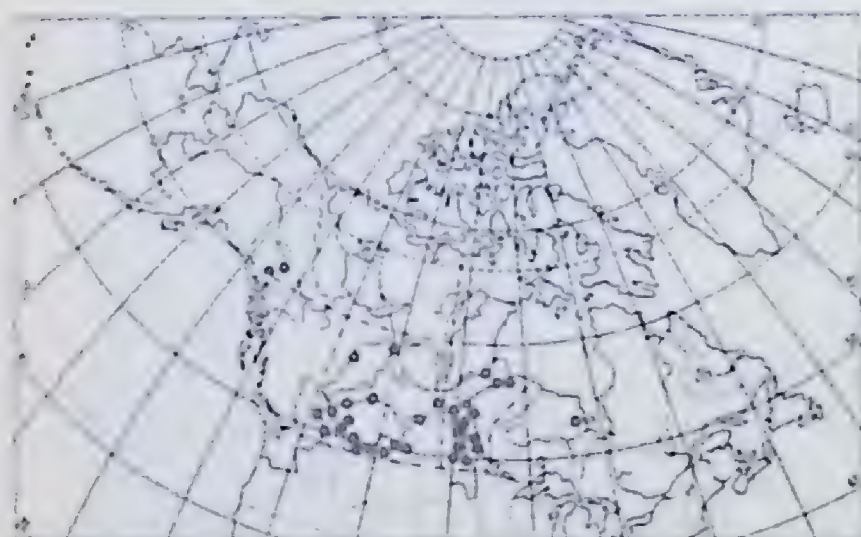
98. *Potentilla multifida* L.



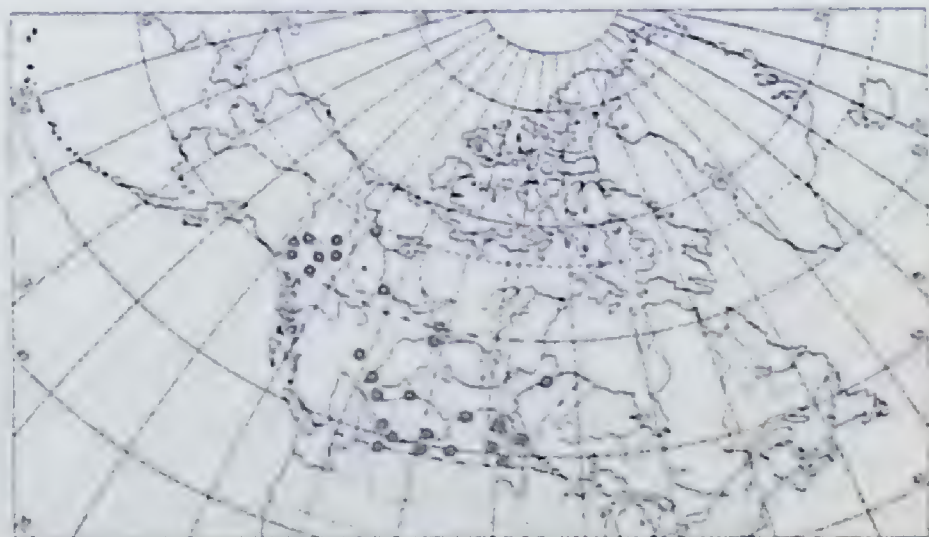
99. *Sorbus scopulina* Greene



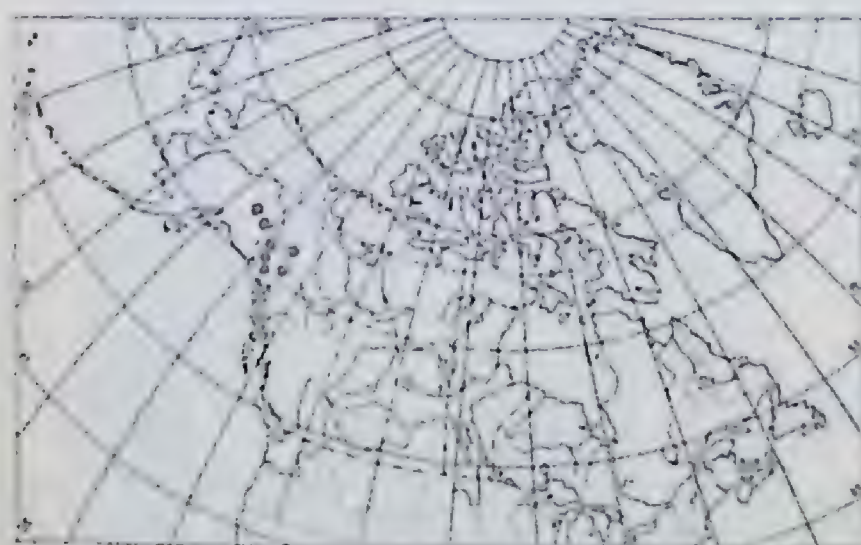
100. *Astragalus aboriginorum* Richards.



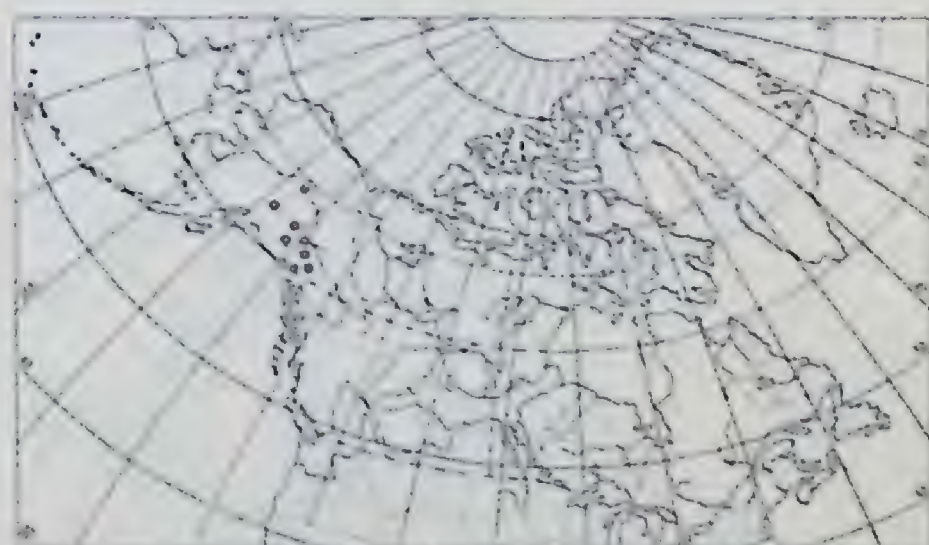
101. *Astragalus goniatus* Nutt.



102. *Astragalus striatus* Nutt.



103. *Astragalus tananaicus* Hult.



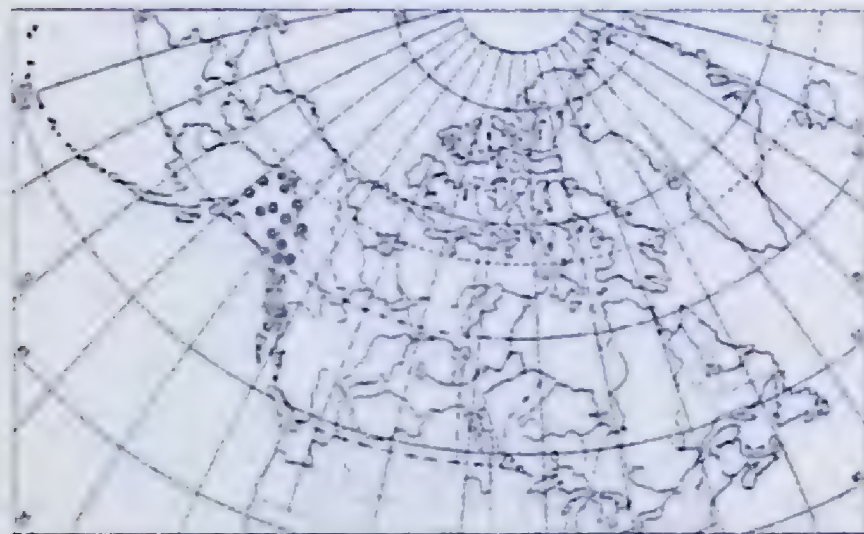
104. *Oxytropis Huddelsonii* Porsild



105 A. *Oxytropis Maydelliana* Trautv. (circles)
B. *O. Maydelliana* ssp. *melanocephala* (Hook.) Porsild (dots)



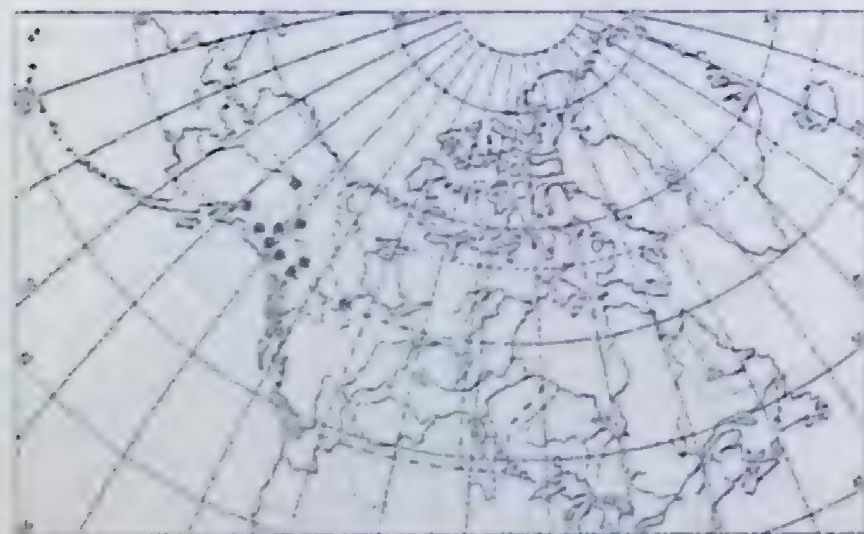
106. *Oxytropis pygmaea* (Pall.) Fern.



107. *Oxytropis Scammaniana* Hult.



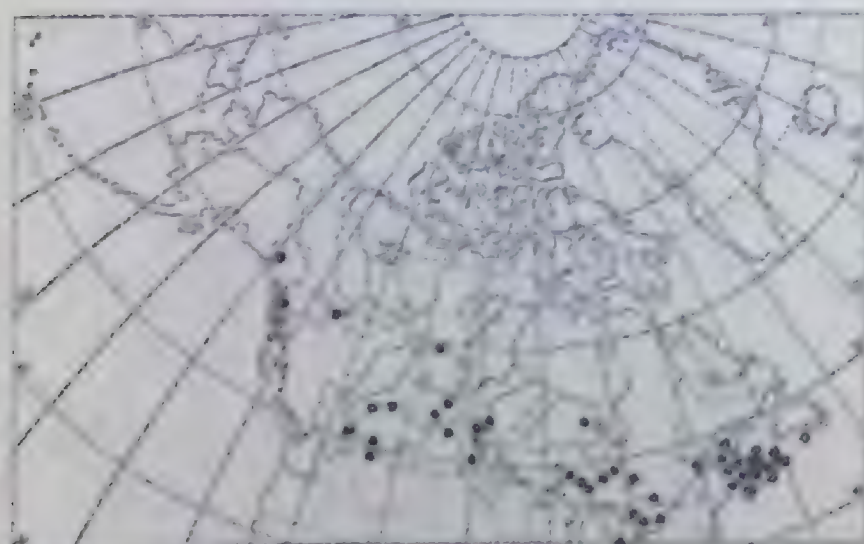
108. *Oxytropis spicata* (Hook.) Standl.



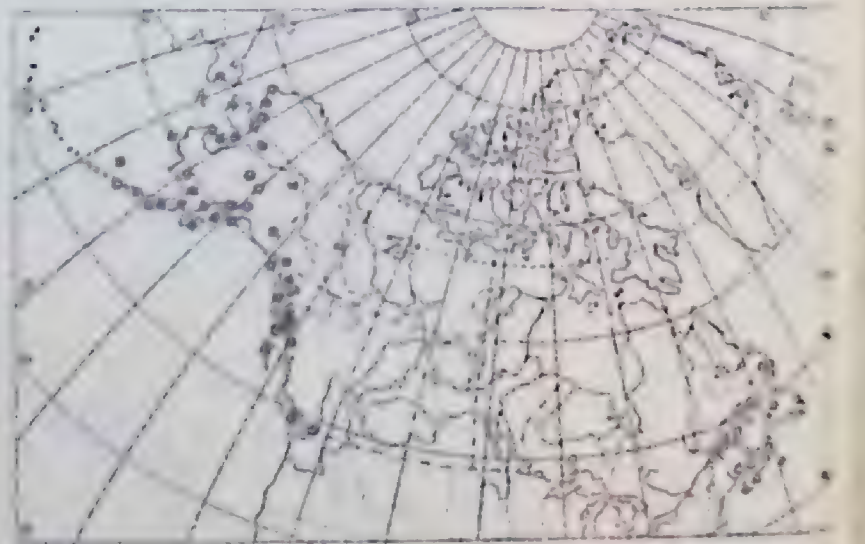
109. *Oxytropis varians* (Rydb.) Hult.



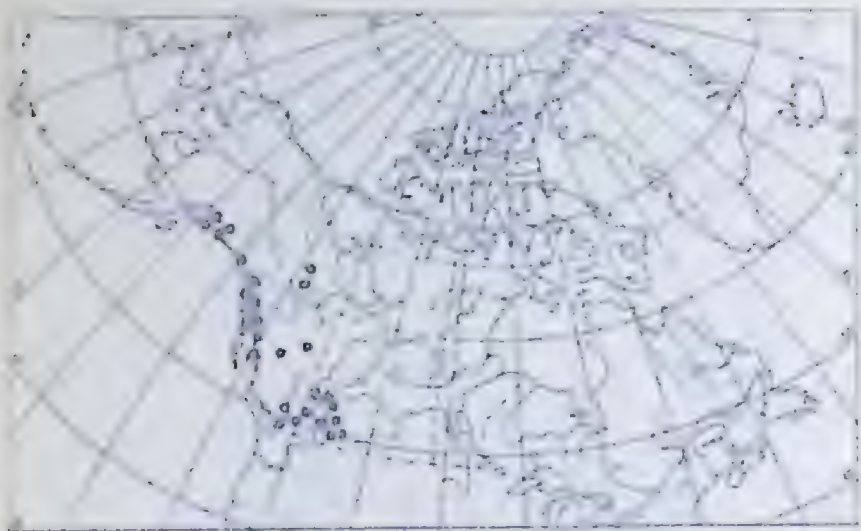
110. *Oxytropis viscidula* (Rydb.) Tidestr.



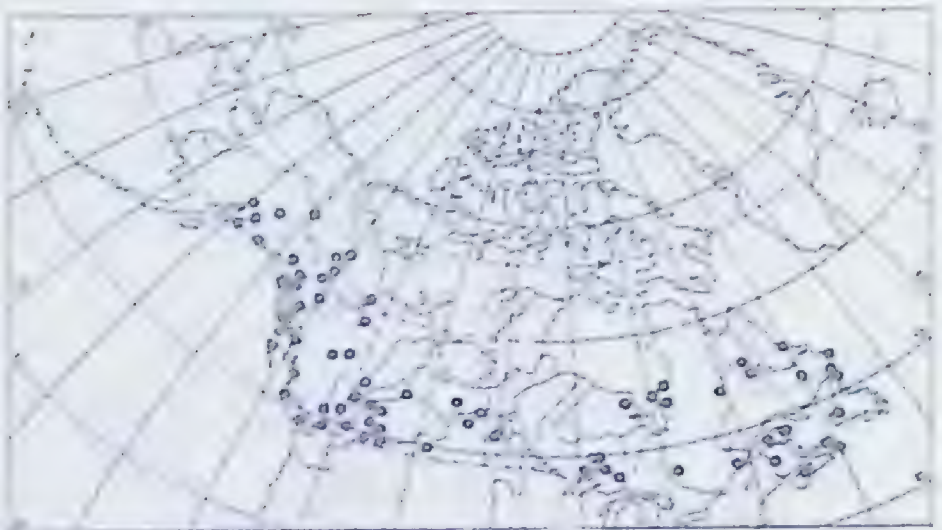
111. *Epilobium leptophyllum* Raf.



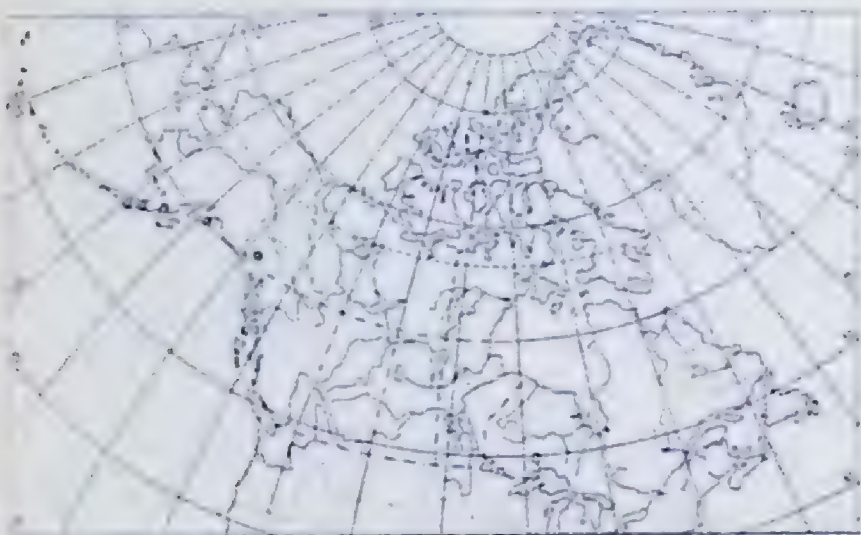
112. A. *Coelopleurum Gmelini* (DC.) Ledeb (dots)
B. *C. lucidum* (L.) Fern. (rings)



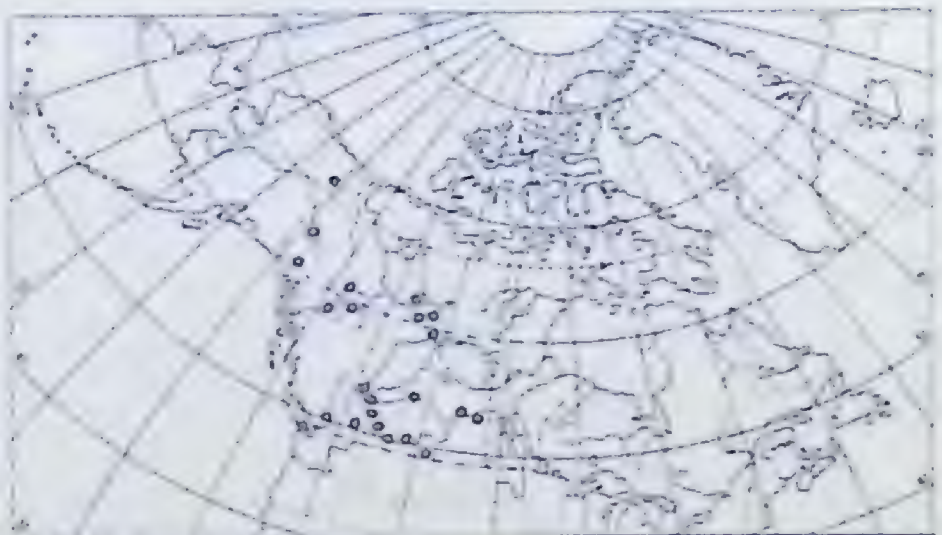
113. *Phyllodoce glanduliflora* (Hook.) Cov.



114. *Vaccinium caespitosum* Michx.



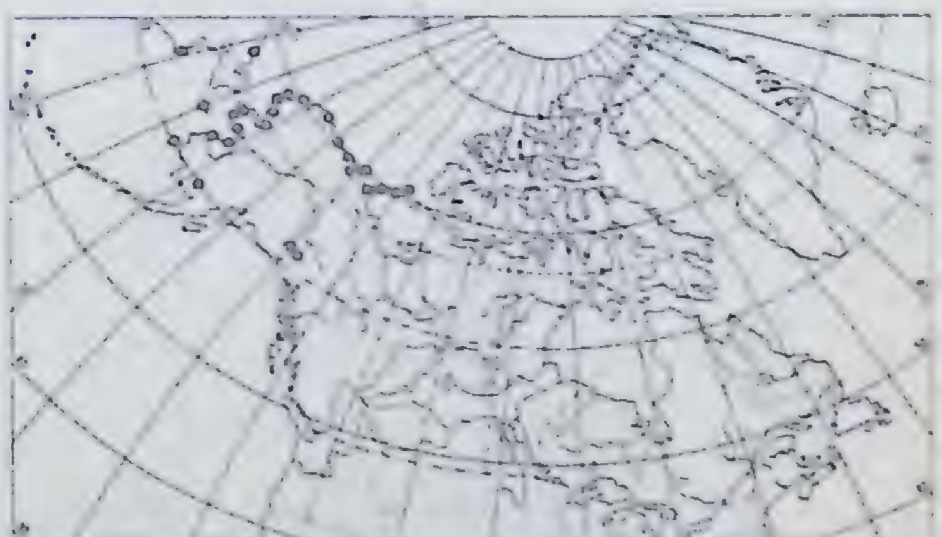
115. *Androsace alaskana* Cov. & Standl.



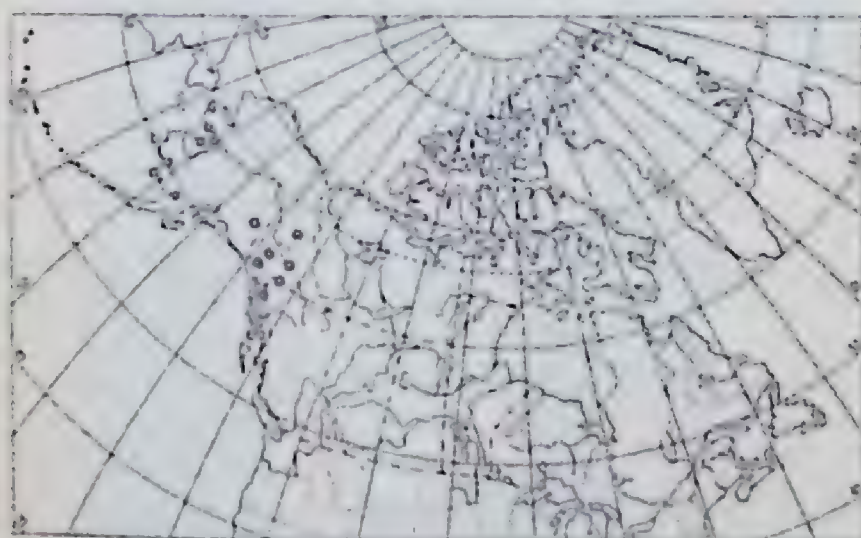
116. *Dodecatheon pauciflorum* (Dur.) Greene



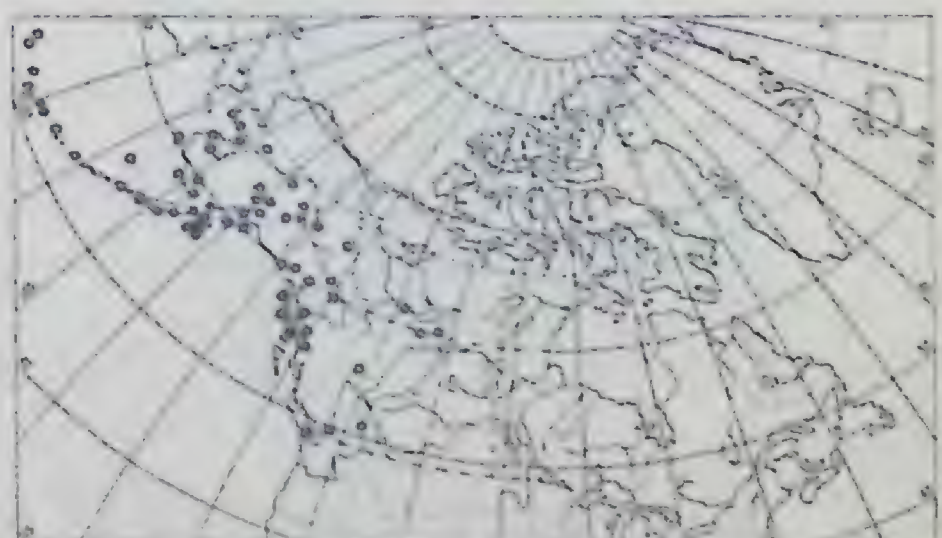
117. A. *Douglasia Gormanii* Const. (dots)
B. *D. arctica* Hook. (rings)



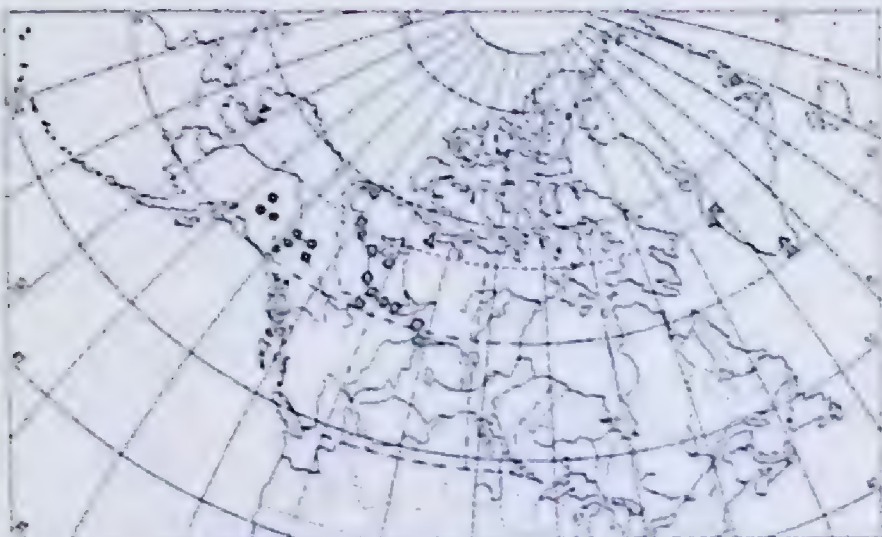
118. *Primula borealis* Duby



119. *Primula sibirica* Jacq.



120. *Trientalis europaea* L. ssp. *arctica*
(Fisch.) Hult.

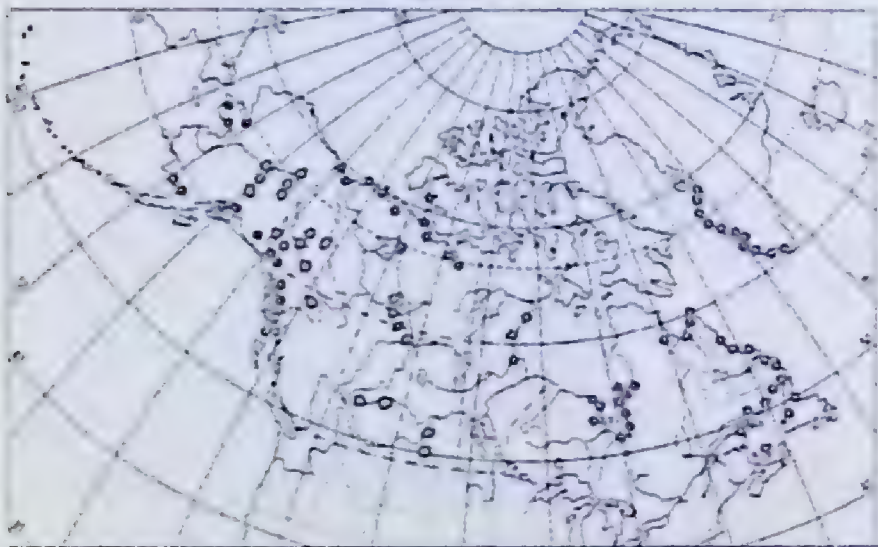


121. Northwestern Races of *Gentiana*
[*Gentianella*] *detonsa* Rottb.

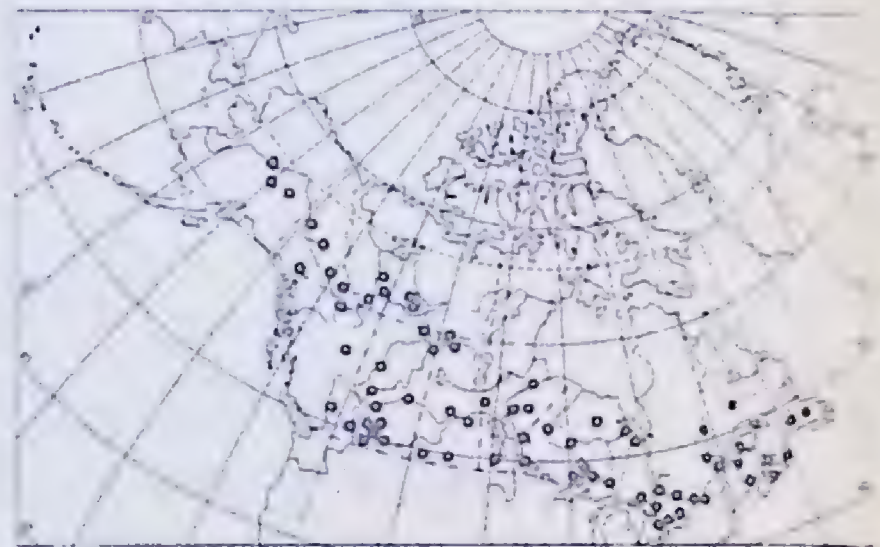
- A. ssp. *yukonensis* Gillett (dots)
- B. ssp. *Raupii* (Porsild) Gillett (rings)
- C. ssp. *detonsa* (incl. *G. Richardsonii* Porsild) (triangles)



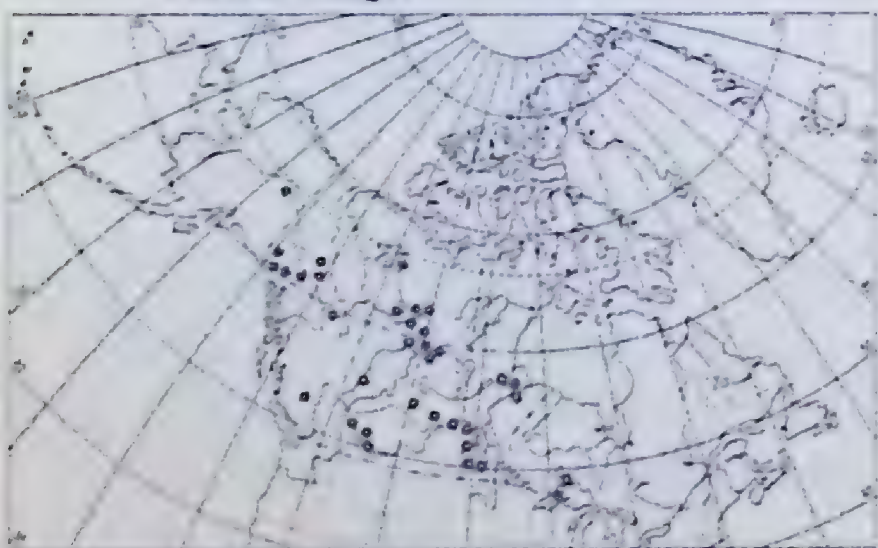
122. *Gentiana tenella* Rottb.



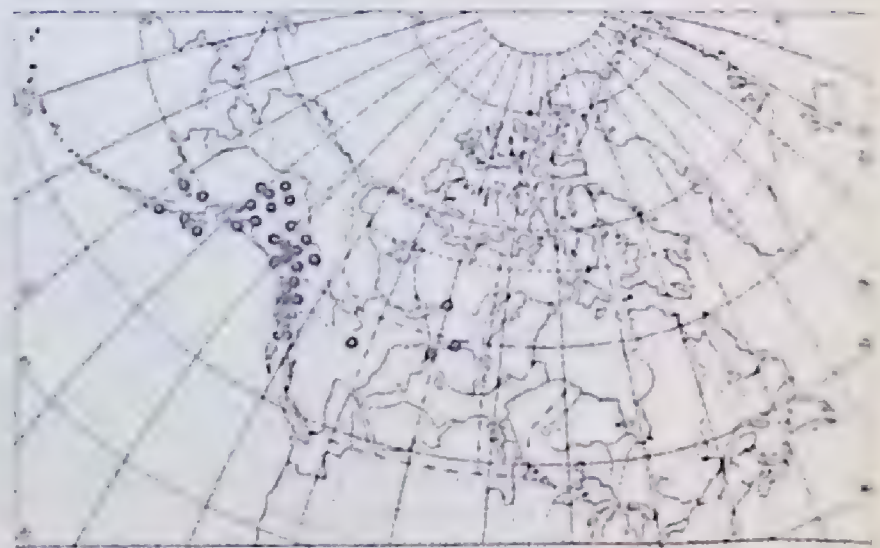
123. A. *Lomatogonium rotatum* (L.) Fr. (dots)
B. *L. rotatum* ssp. *tenuifolium* (Griseb.) Porsild (rings)



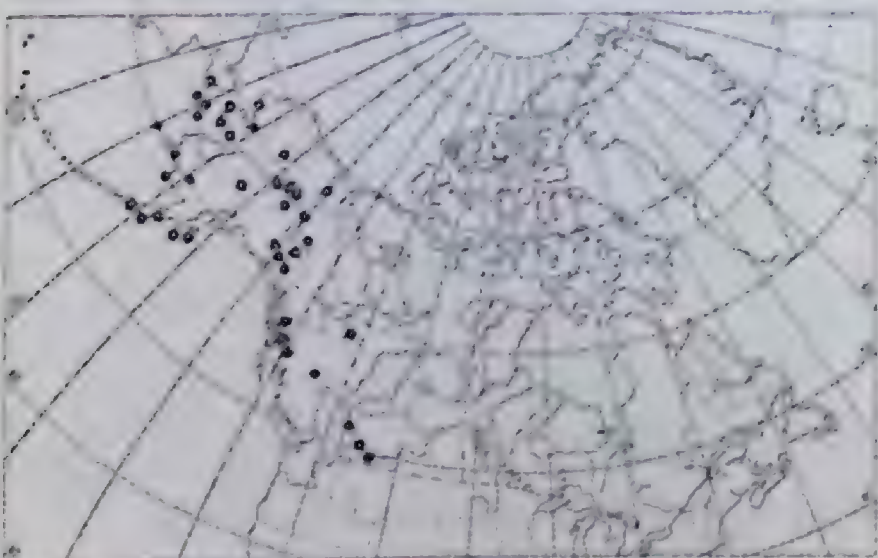
124. *Apocynum androsaemifolium* L.



125. *Phacelia Franklinii* (R.Br.) Gray



126. *Euphrasia subarctica* Raup



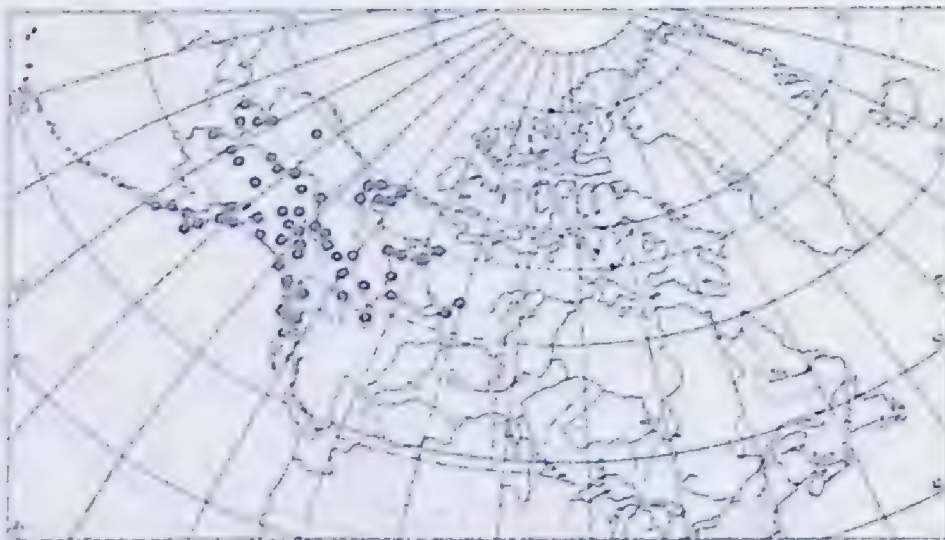
127. *Pedicularis Oederi* Vahl



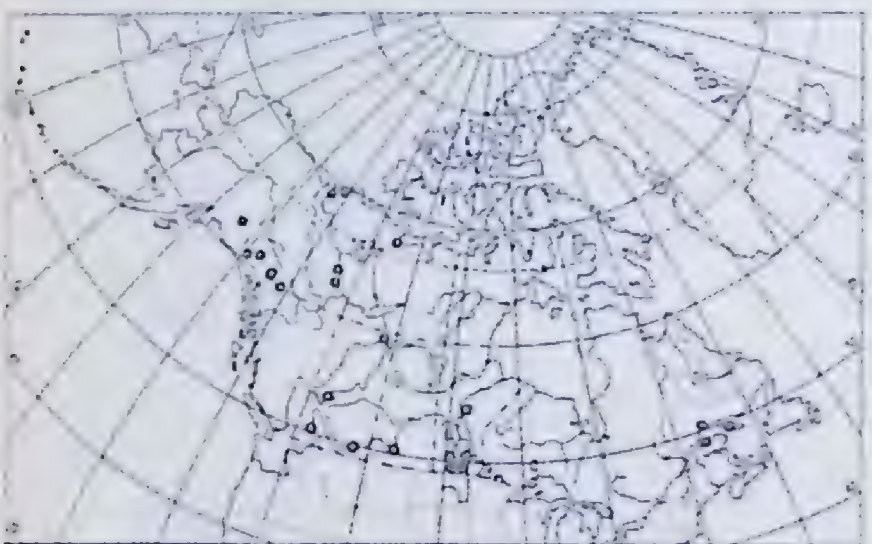
128. *Veronica americana* Schwein.



129. *Veronica scutellata* L.



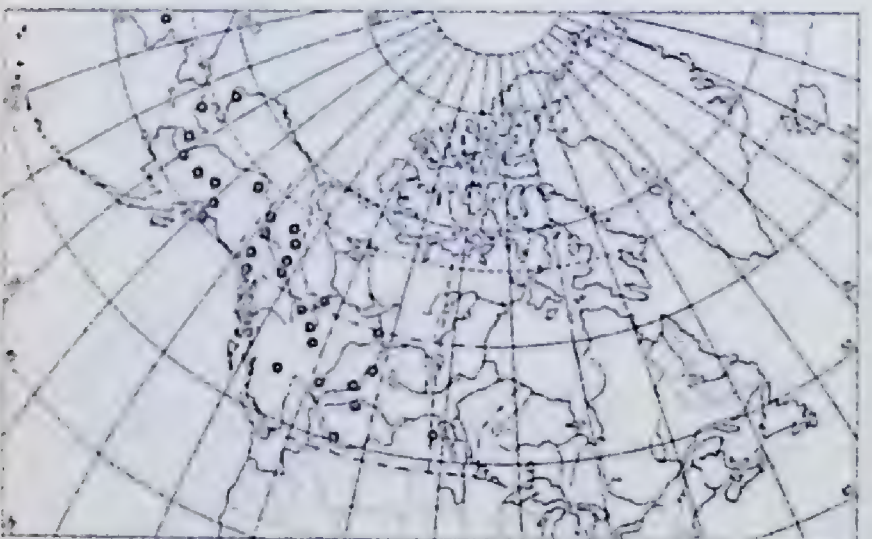
130. *Boschniakia rossica* (Cham. & Schlecht.) Fedtsch.



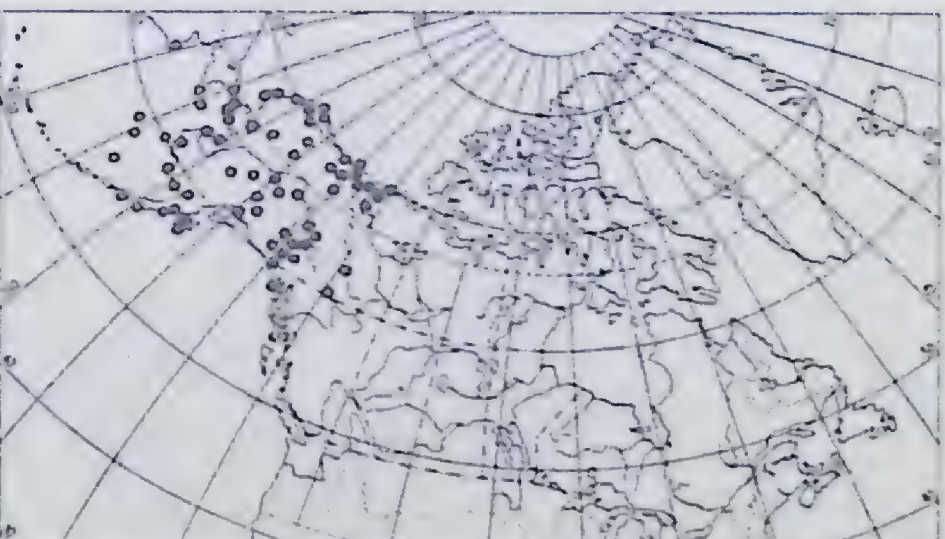
131. *Plantago eriopoda* Torr.



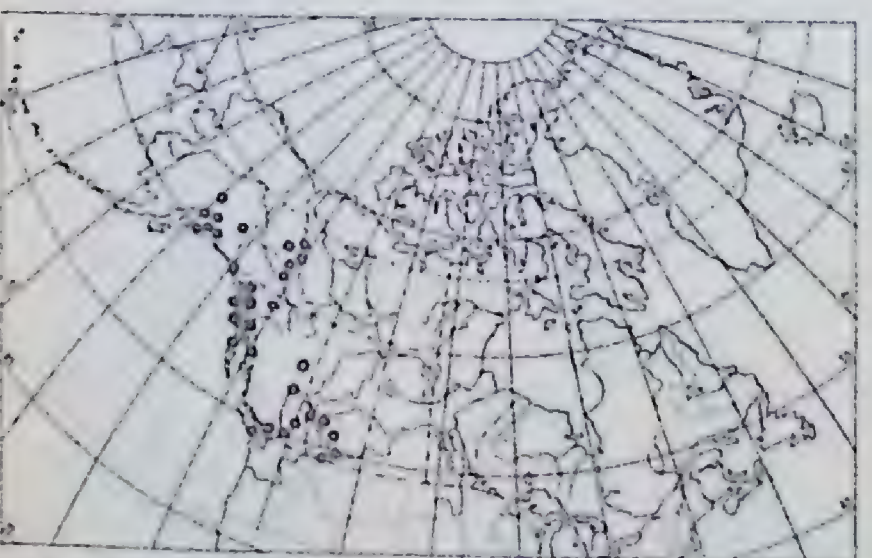
132. *Galium triflorum* Michx.



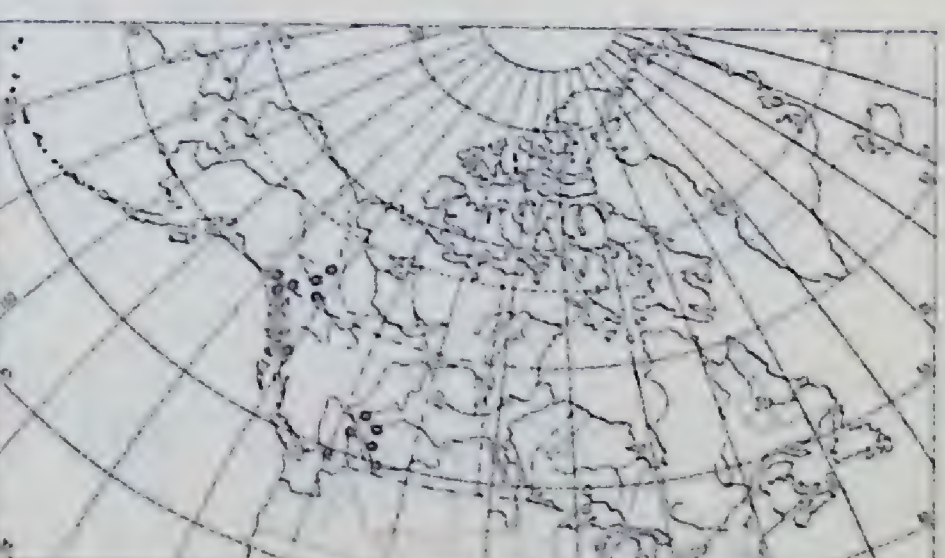
133. *Adoxa Moschatellina* L.



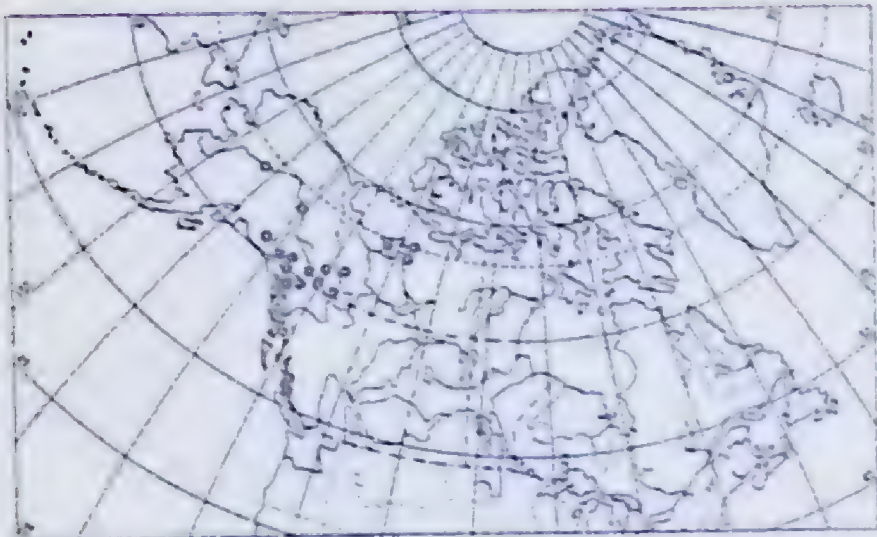
134. *Valeriana capitata* Pall.



135. *Valeriana sitchensis* Bong.



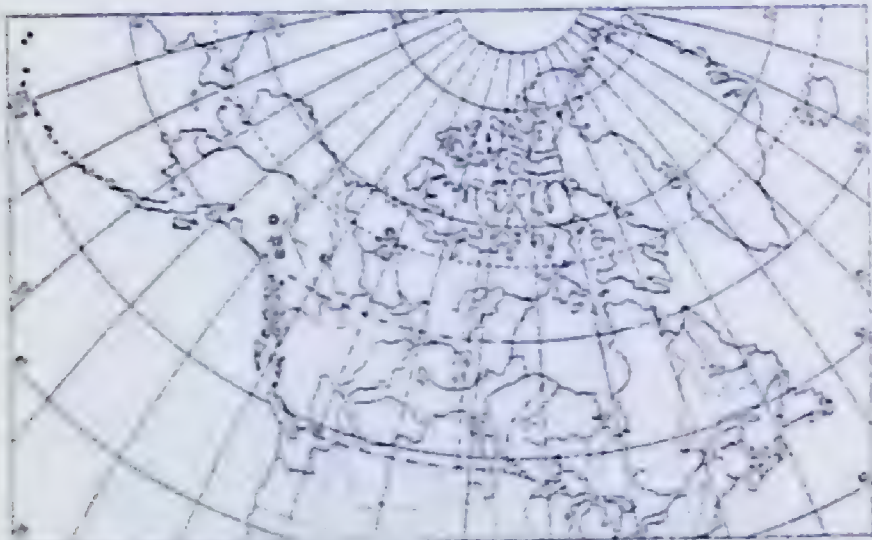
136. *Agoseris aurantiaca* (Hook.) Greene



137. *Antennaria alborosea* Porsild



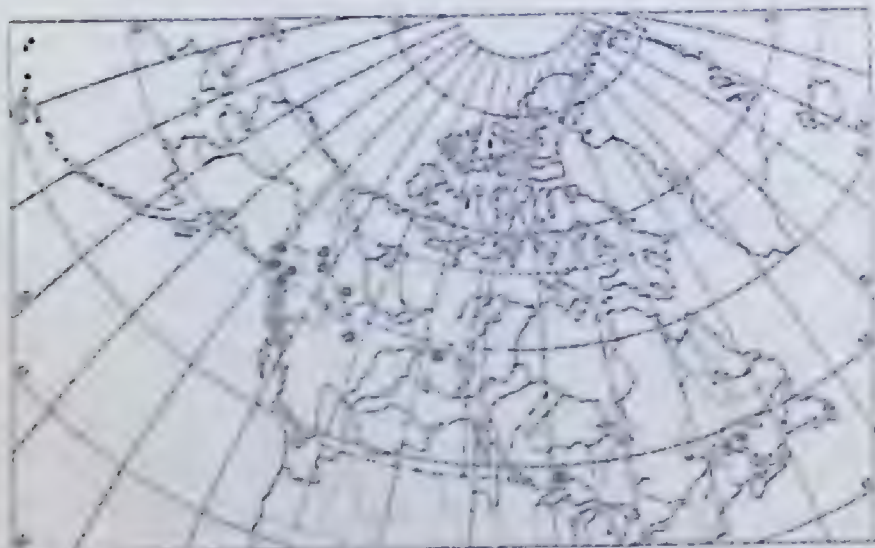
138. *Antennaria elegans* Porsild



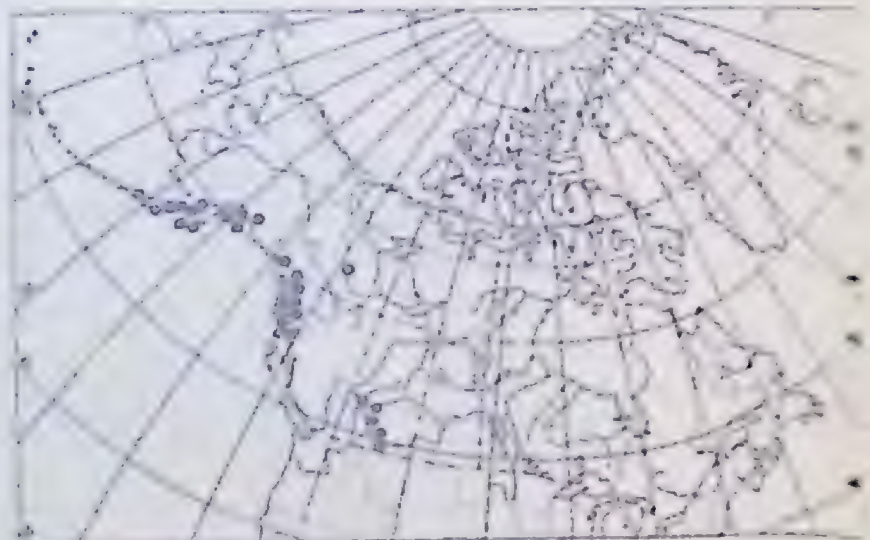
139. *Antennaria incarnata* Porsild



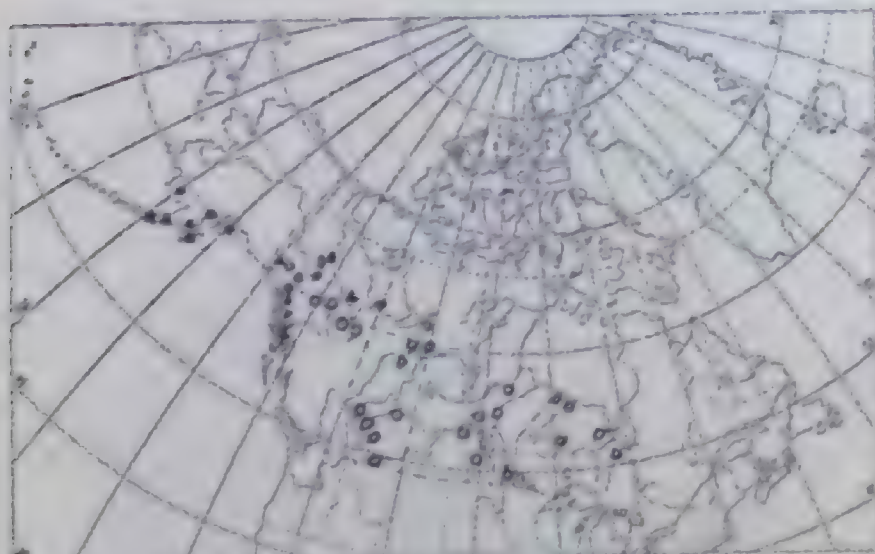
140. *Antennaria pallida* E. Nels.



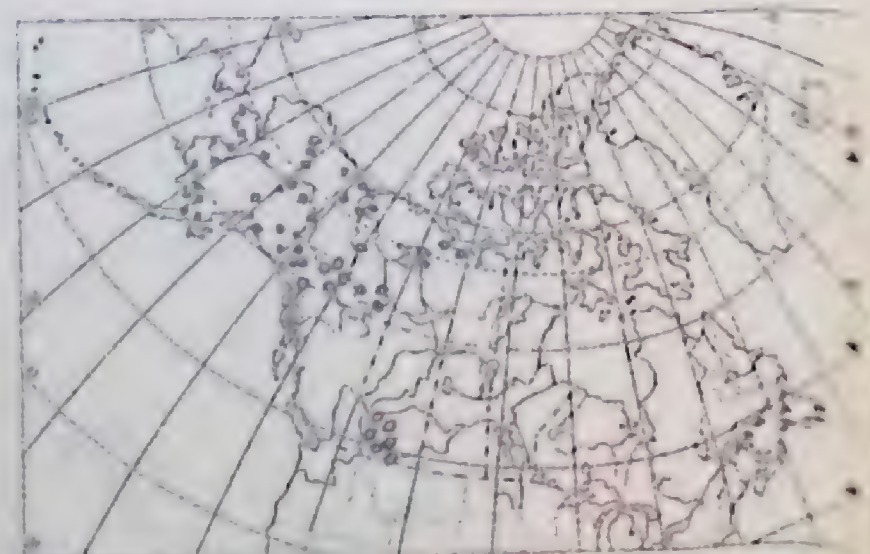
141. *Antennaria subviscosa* Fern.



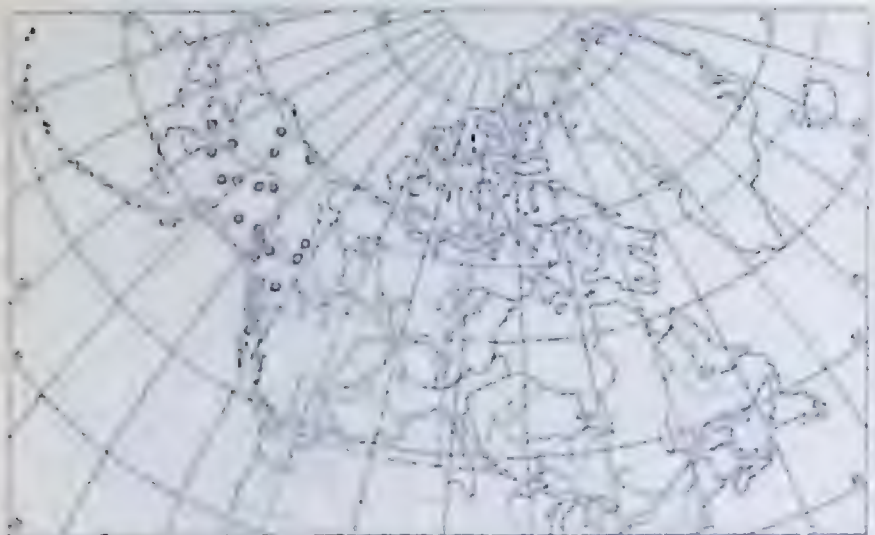
142. *Arnica amplexicaulis* Nutt.



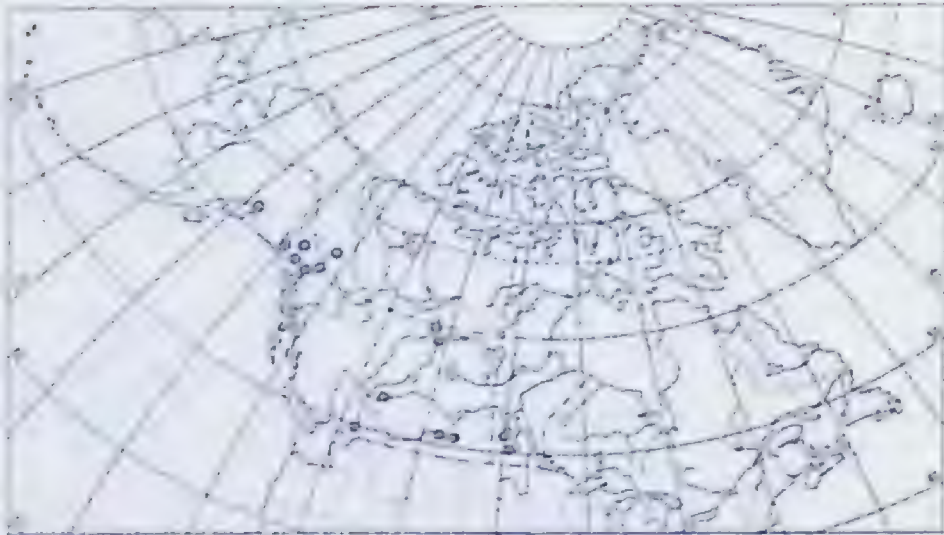
143. *Arnica Chamissonis* Less.
A. ssp. *genuina* (triangles)
B. ssp. *foliosa* (Nutt.) Maguire (dots)
C. ssp. *incana* (Gray) Maguire (rings)



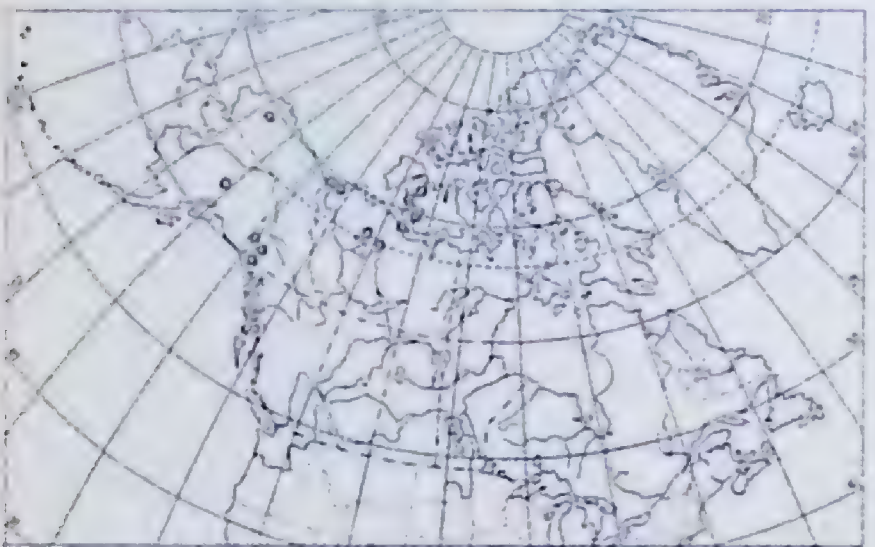
144. *Arnica louiseana* Farr
A. ssp. *frigida* (Meyer ex Iljin) Maguire (dots)
B. ssp. *genuina* (rings)
C. ssp. *Griscomi* (Fern.) Maguire (triangles)



145. *Artemisia alaskana* Rydb.



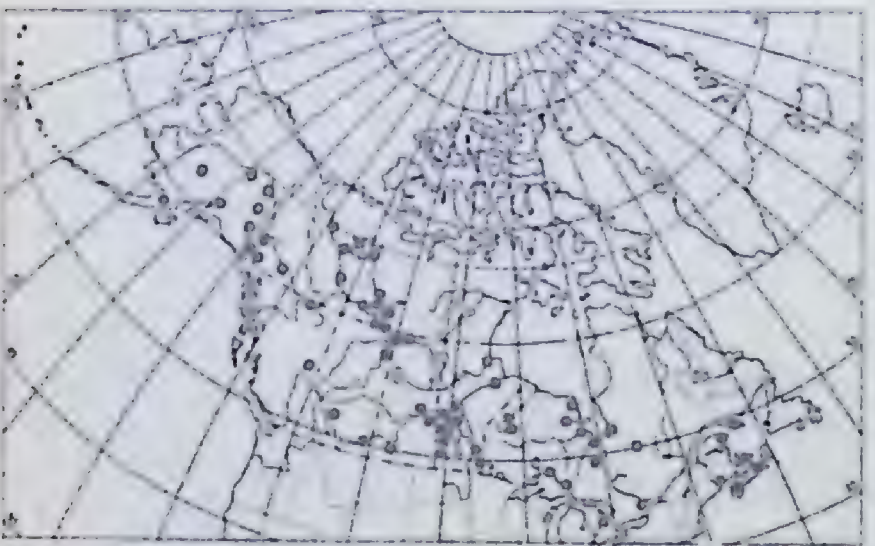
146. *Artemisia Dracunculoides* L.



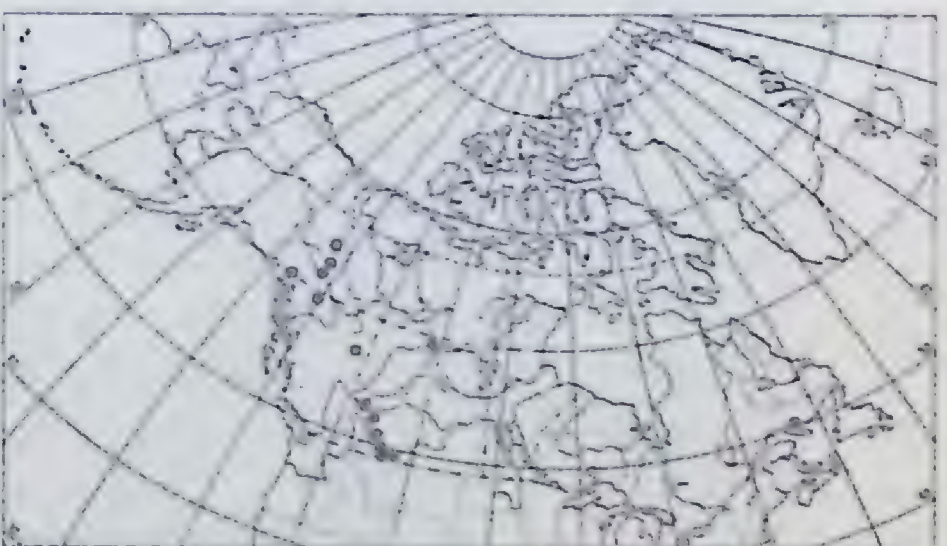
147. *Artemisia hyperborea* Rydb.



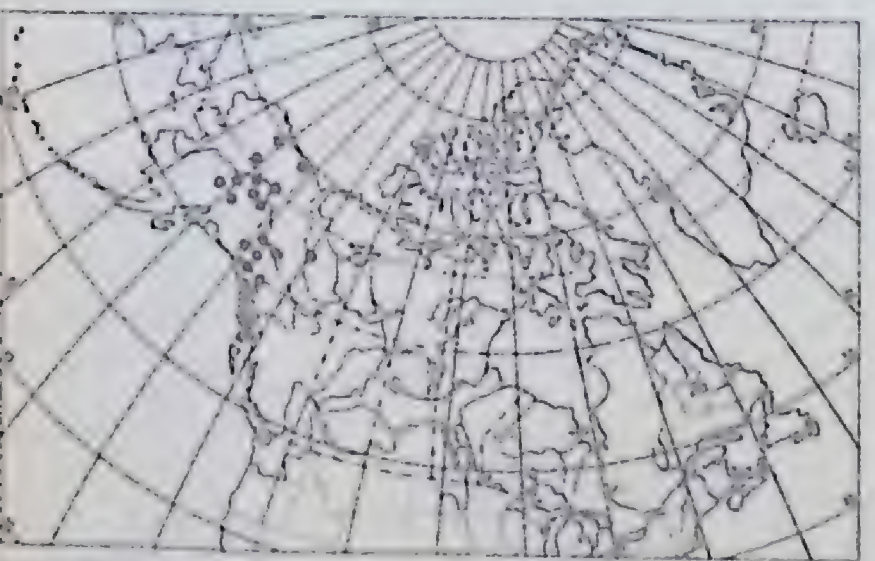
148. *Aster alpinus* L. ssp. *Vierhapperi* Onne



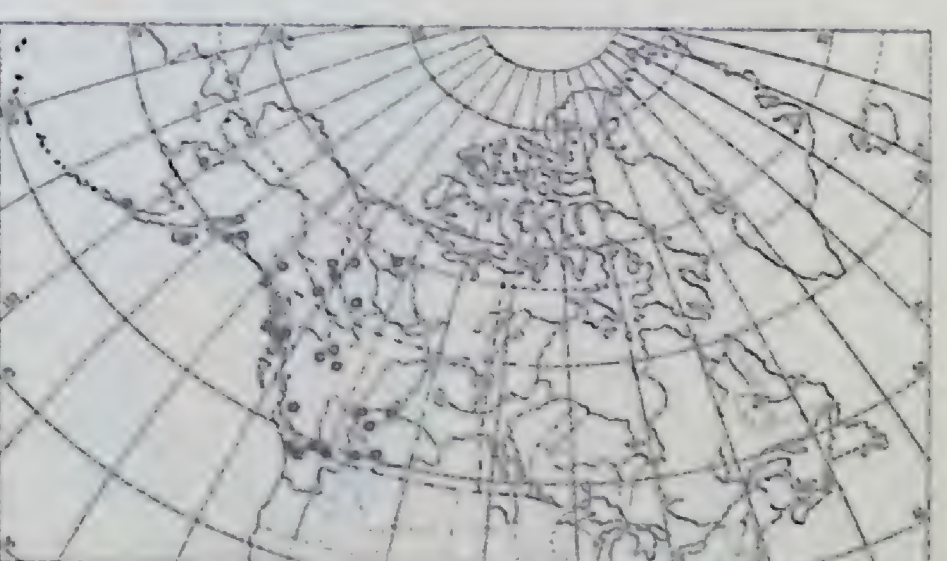
149. *Aster junciformis* Rydb.



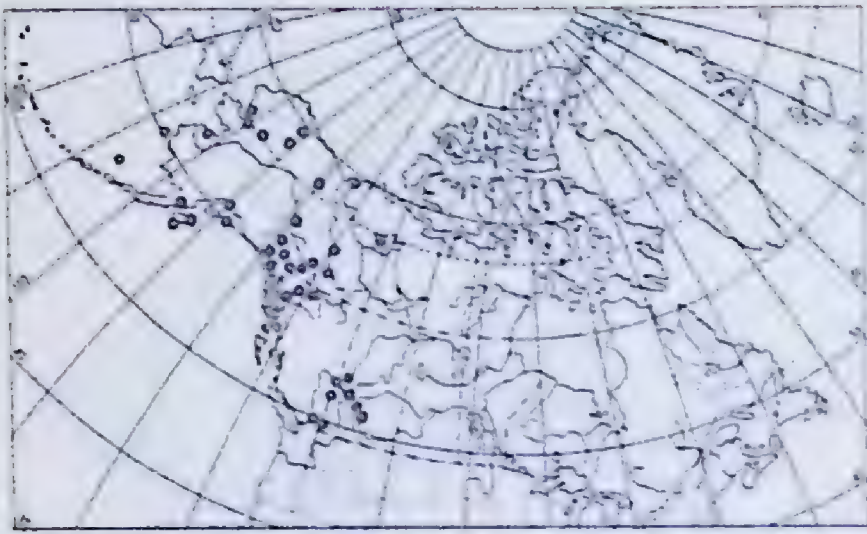
150. *Cirsium foliosum* (Hook.) DC.



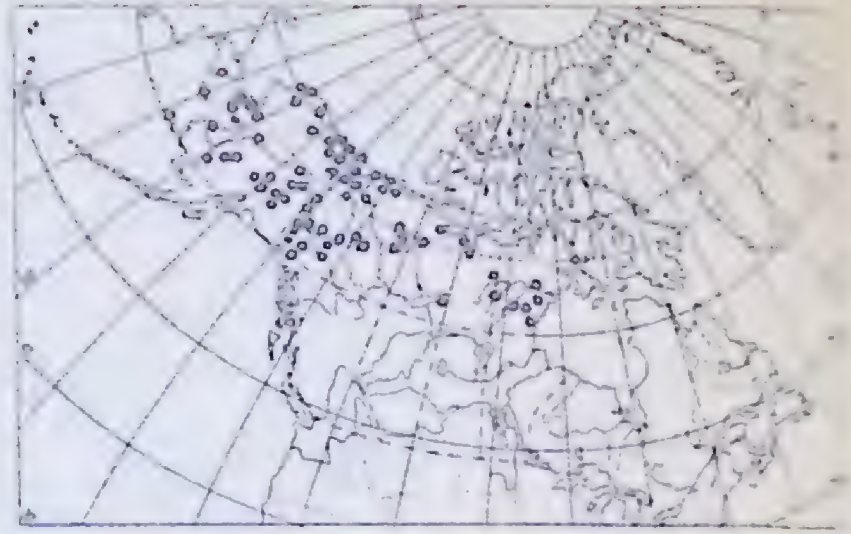
151. *Erigeron purpuratus* Greene



152. *Hieracium gracile* Hook.



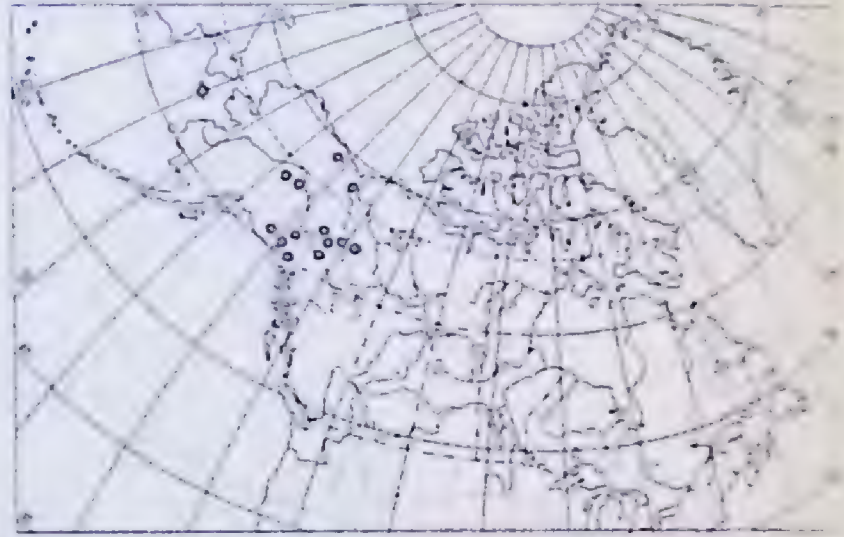
153. *Petasites hyperboreus* Rydb.



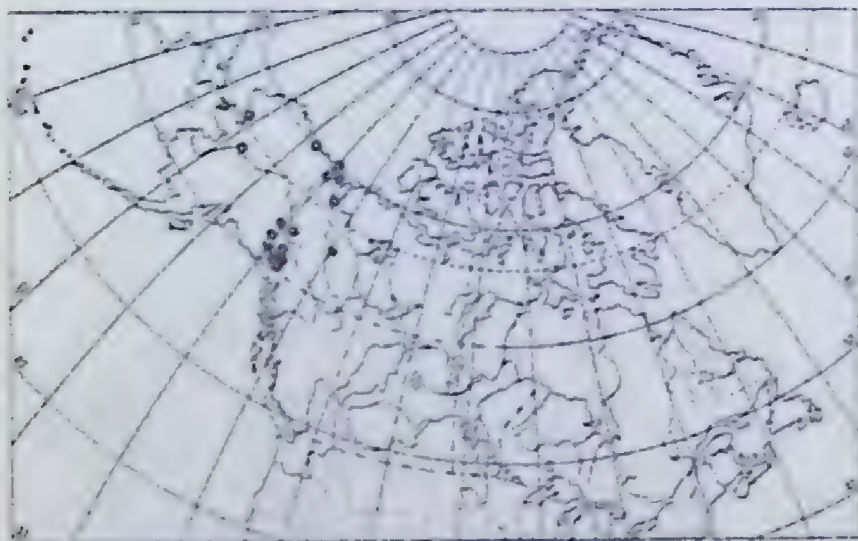
154. *Saussurea angustifolia* DC. (dots)
S. angustifolia var. *yukonensis* Porsild (lines)



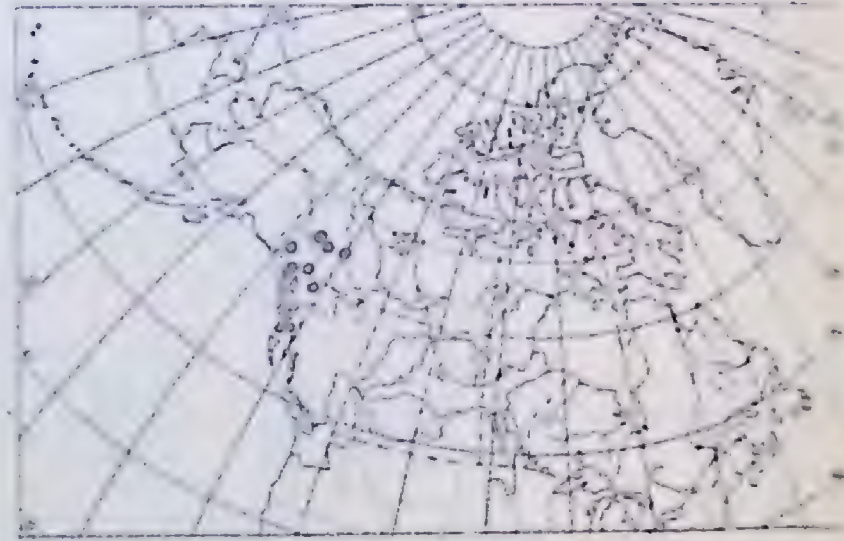
155. *Senecio conterminus* Greenm.



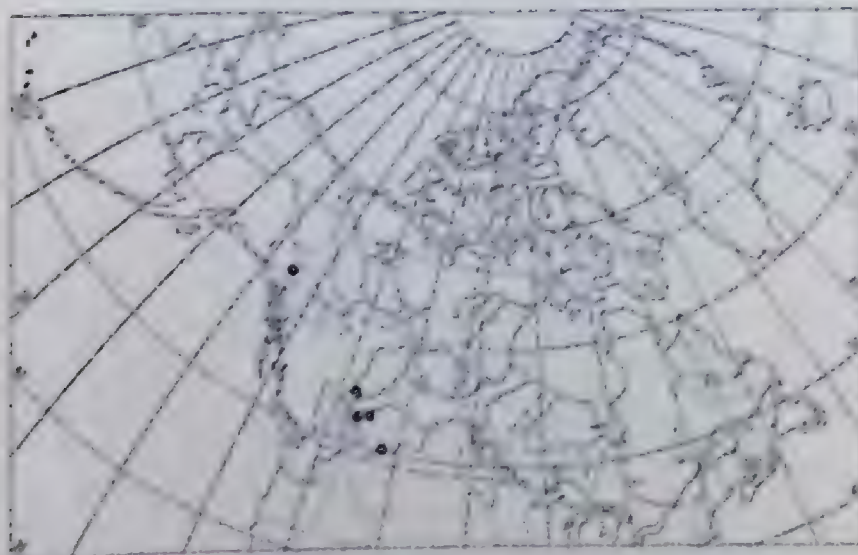
156. *Senecio Kjellmanii* Porsild



157. *Senecio Lindstroemii* (Ostf.) Porsild



158. *Senecio sheldonensis* Porsild



159. *Townsendia Hookeri* Beaman

BRYOPHYTES OF LABRADOR AND UNGAVA

BY HOWARD CRUM AND PAAVO KALLIO

RÉSUMÉ

Communication du Labrador et de l'Ungava: 27 hépatiques, 14 sphaignes et 144 mousses provenant principalement des herbiers constitués par M. W. B. Schofield en 1949 et M. P. Kallio en 1963.

Improved transportation into the interior of Labrador and the Ungava Peninsula has opened up a vast botanical hinterland which has, until now, been almost unknown bryologically. A few papers on the moss flora of the area have appeared in recent years. Bartram (1954) recorded 42 species of mosses from collections made in 1953 by Francis Harper in many localities in both northern Quebec and Newfoundland-Labrador. Harper (1964) included records from the same collection in an ecological study. J. M. Gillett (1953) contributed a list of 29 mosses and five liverworts which he and W. I. Finlay collected in 1950 in the vicinity of Goose Bay, Labrador.

The present report of 27 liverworts, 14 *Sphagna*, and 144 mosses is based primarily on collections made by the junior author in 1963 and Wilfred B. Schofield in 1949. A number of other specimens examined incidentally have been added.

Wilfred B. Schofield collected in June and August of 1949 in the vicinity of Goose Bay, Labrador (53° 18' N, 60° 25' W). His extensive collections, as well as some made by H. A. Senn at Goose Bay in 1948 and a Miss Montgomery at Northwest River, also in 1948, were kindly lent for study by the Science Service Herbarium of the Department of Agriculture. (Gillett's Goose Bay collection is presumably at the Science Service Herbarium but could not be located for re-examination and correlation with this study.) In 1953 John F. Grayson collected along the railroad then under construction from Seven Islands to Marymac Lake. His specimens from Knob Lake, Greenbush Lake (54° 59' N, 67° 14' W), and Camp 224, Ashuanipi River (52° 59' N, 66° W), all in Quebec, are preserved in the herbarium of the University of Michigan, with a partial series of duplicates at the National Museum of Canada. A few of Francis Harper's collections from various localities have been added to this list, as well as some made by Les A. Viereck at Gerin Mt., Quebec (55° 04' N, 67° 14' W). Kallio's moss collections are deposited in the herbarium of the National Museum of Canada.

The junior author welcomed an opportunity to visit the McGill University Subarctic Laboratory at Knob Lake (now generally called Schefferville) and to collect in various parts of Labrador and northern Quebec because of a biological similarity of those areas to Finnish Lapland where he has had considerable experience, particularly in connection with his duties at the Subarctic Research Station of the University of Turku. Although primarily concerned with fungi, he also made extensive, though incidental, collections of bryophytes and other cryptogams between June 24 and August 20, 1963, mostly within the confines of Newfoundland-Labrador. Some of his collections came from the vicinity of the airport at Knob Lake, 54° 49' N, 66° 48' W, in the province of Quebec, and some from nearby localities perhaps better referred to the Labrador side of an uncertain boundary: Ruth Ridge and Ruth Lake, 54° 46' N, 66° 51' W; Bean Lake

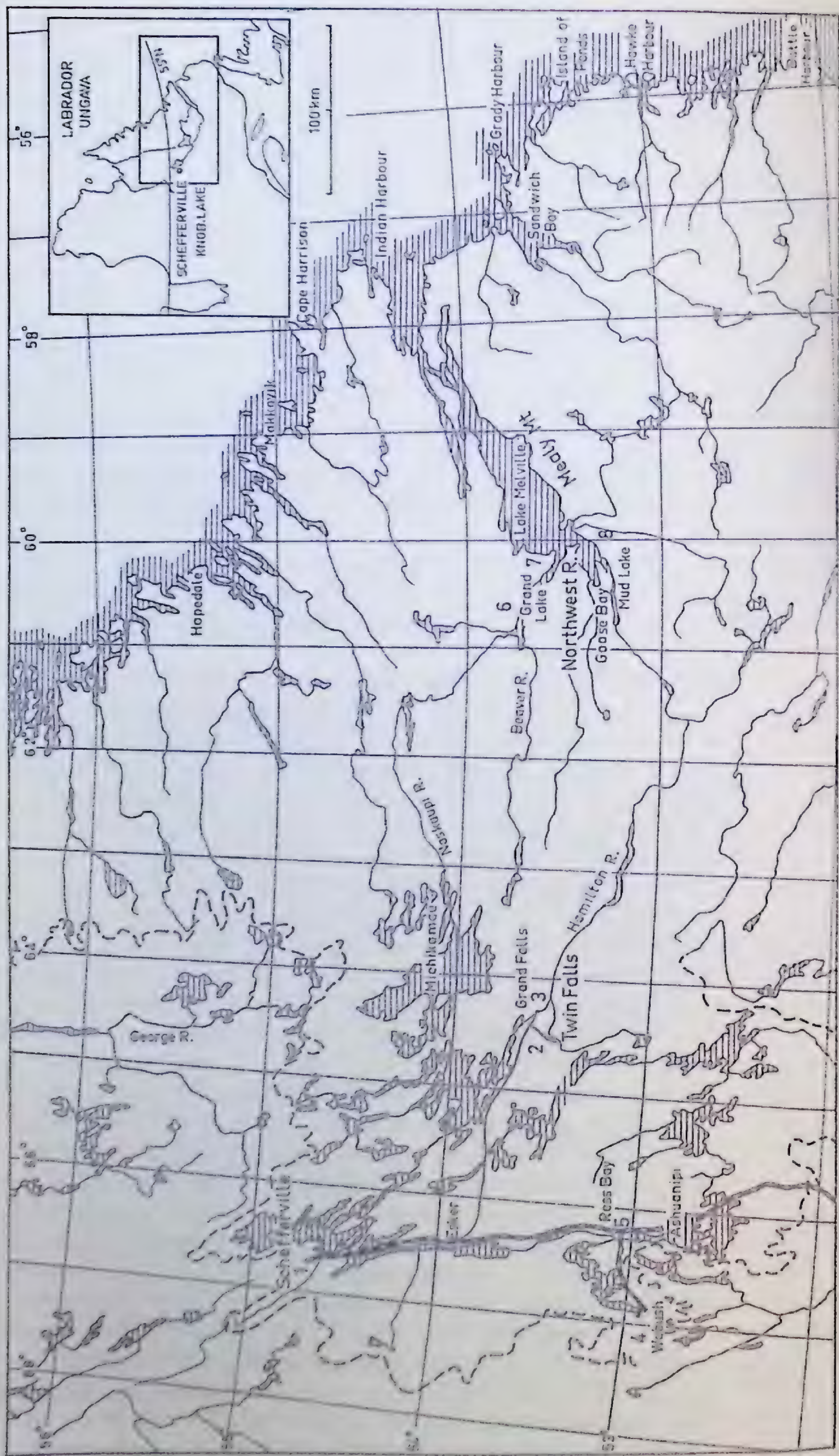


FIGURE 1.—Map of Labrador and Ungava showing collecting localities numbered as follows: 1, Kibik Lake (Schefferville), 2, Twin Falls, 3, Grand Fells, 4, Wabush, 5, Reas Bay, 6, Grand Fells, 7, Northwest R., 8, Goose Bay, 9, Mud Lake, 10, Lake Melville, 11, Northwest R., 12, Grady Harbour, 13, Sandwich Bay, 14, Island of Fens, 15, Hawke Harbour.



Spruce-lichen heath and dwarf shrub-lichen-spruce forest northeast of Knob Lake, with Attikamagen Lake in the background.

and between Ruth and Bean lakes, $54^{\circ} 46' \text{ N}$, $66^{\circ} 50' \text{ W}$; Slimy Lake, $54^{\circ} 47' \text{ N}$, $66^{\circ} 50' \text{ W}$; and Irony Mountain, $54^{\circ} 54' \text{ N}$, $67^{\circ} 09' \text{ W}$. Other Labrador collections were made at the following places: Cape Caribou (Grand Lake), $53^{\circ} 38' \text{ N}$, $60^{\circ} 26' \text{ W}$.—Northwest River, $53^{\circ} 32' \text{ N}$, $60^{\circ} 09' \text{ W}$; Little Lake, $53^{\circ} 33' \text{ N}$, $60^{\circ} 11' \text{ W}$; between Northwest River and Goose River.—Wabush, $52^{\circ} 54' \text{ N}$, $66^{\circ} 53' \text{ W}$; Carol Lake (Wabush River), $52^{\circ} 57' \text{ N}$, $66^{\circ} 54' \text{ W}$; Ross Bay, $52^{\circ} 55' \text{ N}$, $66^{\circ} 10' \text{ W}$.—Grand Falls (locally called Hamilton Falls), $53^{\circ} 36' \text{ N}$, $64^{\circ} 18' \text{ W}$.—Twin Falls area ($53^{\circ} 31' \text{ N}$, $64^{\circ} 31' \text{ W}$): Unknown River: Scott Falls; Thomas Falls; Bonnel Creek; and between Esker and Twin Falls (23 and 39 miles from Esker).

The major collecting localities are shown by number on the accompanying map (Figure 1). At Knob Lake (Figure 1, locality no. 1) the presence of both sedimentary and volcanic rocks results in a richer flora than that found on the Archean granites and other acid rocks of surrounding areas. Although situated in the monotony of the subarctic forest-tundra transition zone, the area offers unusual ecological variety because of its heterogeneous bedrock and irregular topography; black spruce muskegs, spruce-lichen forests, and dwarf shrub-lichen heaths are characteristic. Alpine heaths with oligotrophic vegetation are well represented above the forest limit (at about 700 m) on nearby mountains. The most typical plants of the alpine heath are *Carex bigelowii*, *C. terra-novae* (*C. glacialis*), *Juncus trifidus*, *Luzula confusa*, *Salix herbacea* and other dwarf willows, *Betula glandulosa*, *Vaccinium uliginosum* var. *alpinum*, *V. vitis-idaea* var. *minus*, *Loiseleuria procumbens*, *Phyllodoce coerulea*, *Empetrum hermaphroditum*, and *Diapensia lapponica*. Typical lichens are *Alectoria ochroleuca*, *A. nigricans*, *Cetraria nivalis*, *C. islandica*, and many species of *Cladonia*. Between



Semi-tundra north of Ruth Ridge, with *Betula glandulosa* and *Picea glauca* in the foreground.

the alpine zone and the forest proper is a park-like semi-tundra with a scattering of *Picea glauca*, *P. mariana*, and *Betula glandulosa* (Plate I). Small bogs and fens also occur in the area.

In the vicinity of Ruth Lake, collections were made in semi-tundra and barren alpine regions at altitudes exceeding 2,000 feet (Plate II). On a dolomite slope on the east side of Slimy Lake (at 2,000 ft. alt.), typical basophiles such as *Woodsia glabella*, *Salix vestita*, *S. reticulata*, *Draba norvegica*, *Solorina saccata*, and *Cladonia cariosa* were found.

In the Twin Falls area (Figure 1, locality no. 2) are muskegs and meadow forests with fairly luxuriant vegetation, including *Picea glauca*, *P. mariana*, *Abies balsamea*, *Betula papyrifera*, and *Populus balsamifera*, often with *Clintonia borealis* abundant as undercover. Alder copses are common along shores, and rocky slopes are often rich in lichens. *Dryopteris fragrans*, more common along the Labrador coast, was frequently found on such slopes.

Grand Falls on the Hamilton River (Figure 1, locality no. 3), with a drop of nearly 100 metres, provides an oceanic climate to its immediate surroundings. At its base is a wet meadow on a high, treeless slope (Plate III) occupied by such plants as *Selaginella selaginoides*, *Salix arctica*, *Scirpus caespitosus*, *Eriophorum* sp., and *Arabis alpina*. Trees surrounding the meadow are rich in cryptogamic epiphytes, including *Leptogium saturninum*, *Lobaria pulmonaria*, and *Pseudocyphellaria crocata*.

At Northwest River, at the western end of Melville Lake (Figure 1, locality 7), is an isolated example of boreal forest; balsam fir is common there, and *Sphagnum* bogs indicate an acid substrate. Alder and willow copses and, in some places, dense stands of *Myrica* are found along the shores of Melville Lake and some of the other lakes in the area.



Grand Falls of the Hamilton River, with a wet, sloping meadow in the foreground.

A steep slope on the southwest shore of Grand Lake at Cape Caribou (Figure 1, locality 6) has an interesting rock shelf flora, exemplified by *Cryptogramma stelleri*, *Woodsia alpina*, *W. glabella*, *Cerastium alpinum*, *Saxifraga oppositifolia*, *S. aizoon*, *S. cernua*, and *Oxytropis johanensis*. *Dryopteris fragrans* was found on slopes southeast of Cape Caribou.

PTILIDIACEAE

Ptilidium ciliare (L.) Nees—Quebec: Gerin Mt., *Viereck* 695, 740. Knob L., *Grayson* 5034 (with *Ceratodon purpureus*). Greenbush L., *Grayson* 6010. Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Wabush, *Kallio*. Northwest R., *Kallio*.

Ptilidium pulcherrimum (Web.) Hampe—Labrador: Northwest R., *Kallio*. Between Northwest R. and Goose R., *Kallio*. Goose Bay, *Schofield* 664. Traverspine R., *Schofield* 717.

Blepharostoma trichophyllum (L.) Dum.—Labrador: Scott Falls, *Kallio*. Cape Caribou, *Kallio*. Northwest R., *Kallio*. Traverspine R., *Schofield* 726.

LEPIDOZIACEAE

Lepidozia reptans (L.) Dum.—Labrador: Goose Bay, *Schofield* 712.

CEPHALOZIACEAE

- Cephalozia bicuspidata* (L.) Dum.—Labrador: Traverspine R., *Schofield* 718.
Nowellia curvifolia (Dicks.) Mitt.—Labrador: Between Northwest R. and Goose R., *Kallio*. Goose Bay, *Schofield* 710.
Cladopodiella fluitans (Nees) Joerg.—Labrador: Northwest R., *Kallio*. Twin Falls, Unknown R., *Kallio* (with *Scapania* sp.).

HARPANTHACEAE

- Chiloscyphus pallescens* (Ehrh.) Dum.—Labrador: Goose Bay, *Schofield* 42, 658.
Mylia anomala (Hook.) S. F. Gray—Quebec: Knob L., *Grayson* 5008. Labrador: Northwest R., *Kallio*. Between Northwest R. and Goose R., *Kallio*. Goose Bay, *Schofield* 655 (with *Dicranum undulatum*). Lake Alexander, *Senn* 3401 (with *Lophozia ventricosa*).
Mylia taylori (Hook.) S. F. Gray—Labrador: Between Northwest R. and Goose R., *Kallio*. Alexander L., *Senn* 3399.

JUNGERMANNIACEAE

- Lophozia ventricosa* (Dicks.) Dum.—Labrador: Goose Bay, *Schofield* 662.
Isopaches hellerianus (Nees) Buch.—Labrador: Goose Bay, *Schofield* 656. Between Northwest R. and Goose R., *Kallio*.
Sphenolobus minutus (Cr.) St.—Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Ruth Ridge, *Kallio*. Irony Mt., *Kallio*.
Tritomaria quinquedentata (Huds.) Buch.—Labrador: Cape Caribou, *Kallio*. Unknown R., *Kallio*. Scott Falls, *Kallio*.
Temnoma setiforme (Ehrh.) Howe—Labrador: E. of Ruth L., *Kallio*. Irony Mt., *Kallio*. Unknown R., *Kallio*.
Barbilophozia barbata (Schmid.) Loeske—Labrador: Goose Bay, *Schofield* 663.
Barbilophozia hatcheri (Evans) Loeske—Labrador: Cape Caribou, *Kallio*.
Barbilophozia lycopodioides (Wallr.) Loeske—Labrador: Northwest R., *Montgomery*.
Jungermannia lanceolata L.—Labrador: Northwest R., *Kallio*.
Jamesoniella autumnalis (DC.) St.—Labrador: Between Northwest R. and Goose R., *Kallio*.

MARSUPELLACEAE

- Marsupella emarginata* (Ehrh.) Dum.—Labrador: Hamilton Falls, *Kallio*. Northwest R., *Kallio*.

PLAGIOCHILACEAE

- Plagiochila asplenoides* (L.) Dum.—Labrador: Slimy L., *Kallio*. Scott Falls, *Kallio*. Cape Caribou, *Kallio*.

PELLIACEAE

- Pellia fabbroniana* Raddi—Labrador: Terrington Basin, *Schofield* 24. Scott Falls, *Kallio*.

BLASIACEAE

- Blasia pusilla* L.—Labrador: Goose Bay, *Schofield* 659. Northwest R., *Kallio*.

MARCHANTIACEAE

Marchantia polymorpha L.—Labrador: Between Labrador City and Wabush L., *Kallio*. Little Lake, *Kallio*. Scott Falls, *Kallio*. Goose Bay, *Senn* 3347, *Schofield* 26, 648.

Preissia quadrata (Scop.) Nees—Labrador: Bean L., *Kallio*. Scott Falls, *Kallio*.

Conocephalum conicum (L.) Dum.—Labrador: Grand Falls, *Kallio*. Cape Caribou, *Kallio*.

SPHAGNACEAE

Sphagnum capillaceum (Weiss) Schrank—Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Var. *tenellum* (Schimp.) Andr.—Quebec: Knob L., *Grayson* 5007. Labrador: Northwest R., *Kallio*. Twin Falls, *Kallio*.

Sphagnum compactum Lam. & DC.—Labrador: Mt. between Ruth L. and Bear L., *Kallio*.

Sphagnum cuspidatum Ehrh. ex Hoffm.—Labrador: Northwest R., *Kallio*.

Sphagnum fuscum (Schimp.) Klinggr.—Quebec: Knob L., *Grayson* 5008, 5028, 5058, *Kallio*. Greenbush L., *Grayson* 6001. Labrador: Northwest R., *Kallio*. Unknown R., *Kallio*. Between Esker and Twin Falls, *Kallio*. Bonnel Creek, *Kallio*. Scott Falls, *Kallio*.

Sphagnum girgensohnii Russ.—Labrador: Thomas Falls, *Kallio*.

Sphagnum lindbergii Schimp.—Quebec: Camp 224, Ashuanipi R., *Grayson* 6058.

Sphagnum magellanicum Brid.—Quebec: Knob L., *Kallio*.

Sphagnum papillosum Lindb.—Labrador: Northwest R., *Kallio*.

Sphagnum recurvum P.-Beauv.—Quebec: Knob L., *Kallio*. Labrador: Northwest R., *Kallio*.

Sphagnum riparium Ångstr.—Quebec: Knob L., *Harper* 3432.

Sphagnum squarrosum Sw. ex Crome—Labrador: Thomas Falls, *Kallio*.

Sphagnum subsecundum Nees ex Sturm—Labrador: Little L., *Kallio*.

Sphagnum teres (Schimp.) Ångstr.—Labrador: Grand Falls, *Kallio*. Little L., *Kallio*.

Sphagnum warnstorffianum DuRietz—Quebec: Knob L., *Kallio*. Labrador: Wabush, *Kallio*. Carol L., *Kallio*. Unknown R., *Kallio*. Grand Falls, *Kallio*. Between Esker and Twin Falls, *Kallio*. Scott Falls, *Kallio*.

ANDREAEACEAE

Andreaea rupestris Hedw.—Labrador: Between Northwest R. and Goose R., *Kallio*. Irony Mt., *Kallio*.

FISSIDENTACEAE

Fissidens adianthoides Hedw.—Labrador: Grand Falls, *Kallio*.

Fissidens osmundioides Hedw.—Labrador: Scott Falls, *Kallio*. Grand Falls, *Kallio*.

DITRICHACEAE

Trichodon cylindricus (Hedw.) Schimp.—Labrador: Bonnel Creek, *Kallio*.

Ditrichum flexicaule (Schwaegr.) Hampe (fo. *sterile* DeNot.)—Labrador: Scott Falls, *Kallio*. Grand Falls, *Kallio*.

Ditrichum lineare (Sw.) Lindb.—Labrador: Goose Bay, *Schofield* 3, 759 (with *Pogonatum capillare*), 759. Terrington Basin, *Schofield* 62 (with *Polytrichum piliferum*). Ross Bay, *Kallio*.

Ceratodon purpureus (Hedw.) Brid.—Quebec: Knob L., *Grayson* 5034. *Kallio*. Labrador: Mt. between Ruth L. and Bean L., *Kallio*. E. of Ruth L., *Kallio*. Slimy L., *Kallio*. Between Labrador City and Wabush L., *Kallio*. Grand Falls, *Kallio*. Scott Falls, *Kallio*. Goose Bay, *Schofield* 6, 44. Cape Caribou, *Kallio*.

Distichium capillaceum (Hedw.) BSG—Labrador: Slimy L., *Kallio*. Between Esker and Twin Falls, *Kallio*. Goose R., *Schofield* 832. Cape Caribou, *Kallio*.

Distichium inclinatum (Hedw.) BSG—Labrador: Between Esker and Twin Falls, *Kallio*.

SELIGERiaceae

Blindia acuta (Hedw.) BSG—Labrador: Grand Falls, *Kallio*. Cape Caribou, *Kallio*.

DICRANACEAE

Dicranella cerviculata (Hedw.) Schimp.—Labrador: Terrington Basin, *Schofield* 1, 657. Traverspine R., *Schofield* 708 (with *Dicranella crispa*).

Dicranella crispa (Hedw.) Schimp.—Labrador: Cape Caribou, *Kallio*. Traverspine R., *Schofield* 708.

Dicranella palustris (Dicks.) Crundw. ex Warb.—Labrador: Grand Falls, *Kallio*.

Dicranella subulata (Hedw.) Schimp.—Labrador: Cape Caribou, *Kallio*.

Cynodontium strumiferum (Hedw.) Lindb.—Labrador: Between Northwest R. and Goose R., *Kallio*.

Cynodontium tenellum (BSG) Limpr.—Labrador: Between Northwest R. and Goose R., *Kallio*.

Dichodontium pellucidum (Hedw.) Schimp.—Labrador: Grand Falls, *Kallio*.

Oncophorus virens (Hedw.) Brid.—Labrador: Grand Falls, *Kallio*.

Oncophorus wahlenbergii Brid.—Labrador: Irony Mt., *Kallio*. Carol L., *Kallio*. Mt. between Ruth L. and Bean L., *Kallio*. Between Northwest R. and Goose R., *Kallio*. Goose R., *Schofield* 52. Traverspine R., *Schofield* 704.

Dicranoweisia crispula (Hedw.) Lindb. ex Milde—Quebec: Mollie T. Lake, *Harper* 3787.

Dicranum bonjeanii DeNot.—Labrador: Northwest R., *Kallio*.

Dicranum elongatum Schleich. ex Schwaegr.—Quebec: Greenbush L., *Grayson* 6011. Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Ruth Ridge, *Kallio*. Irony Mt., *Kallio*. Scott Falls, *Kallio*.

Dicranum fuscescens Turn.—Knob L., *Grayson*. Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Irony Mt., *Kallio*. Cape Caribou, *Kallio*. Twin Falls, *Kallio*. Scott Falls, *Kallio*. Bonnel Creek, *Kallio*. Northwest R., *Kallio*. Between Northwest R. and Goose R., *Kallio*. Traverspine R., *Schofield* 725. Goose Bay, *Schofield* 46, 660.

Dicranum majus Sm.—Labrador: Goose Bay, *Schofield* 45.

Dicranum montanum Hedw.—Labrador: Between Northwest R. and Goose R., *Kallio*. Bonnel Creek, *Kallio*.

Dicranum scoparium Hedw.—Labrador: Northwest R., *Kallio*. Between Northwest R. and Goose R., *Kallio*. Hamilton R., *Schofield* 703. Grand Falls, *Kallio*. Goose Bay, *Schofield* 47.

Dicranum undulatum Brid. [*D. bergeri* Bland.]—Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Goose Bay, *Schofield* 655. Ross Bay, *Kallio*. Twin Falls, *Kallio*.

ENCALYPTACEAE

Encalypta ciliata Hedw.—Labrador: Cape Caribou, *Kallio*.

Encalypta procera Bruch—Labrador: Slimy L., *Kallio*.

Encalypta rhyptocarpa Schwaegr.—Labrador: Slimy L., *Kallio*. Between Esker and Twin Falls, *Kallio*.

POTTIACEAE

Tortella fragilis (Hook. ex Drumm.) Limpr.—Labrador: Slimy L., *Kallio*. Between Esker and Twin Falls, *Kallio*.

Tortella tortuosa (Hedw.) Limpr.—Labrador: Slimy L., *Kallio*. Between Esker and Twin Falls, *Kallio*.

Bryoerythrophyllum recurvirostrum (Hedw.) Chen—Labrador: Slimy L., *Kallio*.

Barbula acuta (Brid.) Brid.—Labrador: Slimy L., *Kallio*.

Tortula ruralis (Hedw.) Gaertn., Meyer & Scherb.—Labrador: Slimy L., *Kallio*. Cape Caribou, *Kallio*. Between Esker and Twin Falls, *Kallio*.

GRIMMIACEAE

Grimmia affinis Hornsch.—Labrador: Unknown R., *Kallio*. Goose R., *Schofield* 837.

Grimmia alpicola Hedw.—Labrador: Cape Caribou, *Kallio*. Var. *latifolia* (Zett.) Möll.—Labrador: Scott Falls, *Kallio*. Var. *rivularis* (Brid.) Wahl.—Labrador: Traverspine R., *Schofield* 694, 714, 728 (with *Drepanocladus uncinatus*).

Grimmia apocarpa Hedw.—Labrador: Slimy L., *Kallio*. Between Esker and Twin Falls, *Kallio*.

Racomitrium canescens (Hedw.) Brid.—Quebec: Camp 224, Ashuanipi R., *Grayson* 6084.—Labrador: Ross Bay, *Kallio*.

Racomitrium fasciculare (Hedw.) Brid.—Labrador: Between Northwest R. and Goose R., *Kallio*. Cape Caribou, *Kallio*.

Racomitrium heterostichum (Hedw.) Brid.—Quebec: Knob L., *Harper* 3470.—Labrador: Ruth Ridge, *Kallio*. Irony Mt., *Kallio*. Twin Falls, *Kallio*. Unknown R., *Kallio*. Var. *ramulosum* (Lindb.) Jones—Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Bonnel Creek, *Kallio*.

Racomitrium lanuginosum (Hedw.) Brid.—Quebec: Knob L., *Grayson* 5032. E. of Ruth L., *Kallio*.—Labrador: Ruth Ridge, *Kallio*. Irony Mt., *Kallio*.

FUNARIACEAE

Funaria hygrometrica Hedw.—Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Between Labrador City and Wabush L., *Kallio*. Bonnel Creek, *Kallio*. Traverspine R., *Schofield* 706. Happy Valley, *Schofield*. Goose Bay, *Schofield* 2, 258.

SPLACHNACEAE

Tetraplodon angustatus (Hedw.) BSG—Labrador: Goose Bay, Schofield 702. Hamilton R., Schofield 702.

Tetraplodon mnioides (Hedw.) BSG—Labrador: Ruth Ridge, Kallio. Hamilton R., Schofield 702 (with *T. angustatus*). Northwest R., Kallio. Between Northwest R. and Goose R., Kallio. Var. *paradoxus* (R. Br.) C. Jens.—Labrador: Mt. between Ruth L. and Bean L., Kallio.

BRYACEAE

Pohlia cruda (Hedw.) Lindb.—Labrador: Slimy L., Kallio. Cape Caribou, Kallio. Grand Falls, Kallio. Scott Falls, Kallio. Bonnel Creek, Kallio. Between Northwest R. and Goose R., Kallio. Traverspine R., Schofield 724, 725 (with *Dicranum fuscescens*).

Pohlia filiformis (Dicks.) Andr.—Labrador: Grand Falls, Kallio.

Pohlia nutans (Hedw.) Lindb.—Quebec: Knob L., Kallio. Labrador: Mt. between Ruth L. and Bean L., Kallio. Irony Mt., Kallio. Little L., Kallio. Between Northwest R. and Goose R., Kallio. Grand Falls, Kallio. Goose R., Schofield 53. Goose Bay, Schofield 661. Terrington Basin, Schofield 20.

Pohlia proligera (Limpr.) Lindb. ex Arn.—Labrador: Grand Falls, Kallio. Cape Caribou, Kallio (with *Bryum* sp.).

Pohlia pulchella (Hedw.) Lindb.—Labrador: Between Northwest R. and Goose R., Kallio.

Leptobryum pyriforme (Hedw.) Schimp.—Labrador: Between Labrador City and Wabush L., Kallio.

Bryum capillare Hedw.—Labrador: Cape Caribou, Kallio.

Bryum creberrimum Tayl.—Labrador: Slimy L., Kallio. Grand Falls, Kallio.

Bryum knowltonii Barnes—Labrador: Mt. between Ruth L. and Bean L., Kallio.

Bryum pseudotriquetrum (Hedw.) Gaertn., Meyer & Scherb.—Labrador: Irony Mt., Kallio. Little L., Kallio. Scott Falls, Kallio. Grand Falls, Kallio.

Bryum stenotrichum C. M.—Labrador: Scott Falls, Kallio.

MNIACEAE

Mnium affine Bland. ex Schwaegr.—Labrador: Little L., Kallio. Unknown R., Kallio. Traverspine R., Schofield 721.

Mnium cinclidioides Hüb.—Labrador: Little L., Kallio. Thomas Falls, Kallio. Scott Falls, Kallio. Cape Caribou, Kallio. Mud Lake, Kallio.

Mnium cuspidatum Hedw.—Labrador: Northwest R., Kallio. Cape Caribou, Kallio.

Mnium medium BSG—Labrador: Cape Caribou, Kallio.

Mnium orthorrhynchum Brid.—Labrador: Slimy L., Kallio. Unknown R., Kallio. Scott Falls, Kallio. Grand Falls, Kallio. Cape Caribou, Kallio.

Mnium pseudopunctatum Bruch & Schimp.—Labrador: Grand Falls, Kallio. Carol L., Kallio. Goose Bay, Schofield 48.

Mnium punctatum Hedw.—Labrador: Northwest R., Kallio.

Mnium spinulosum BSG—Labrador: Traverspine R., Schofield 719.

Cinclidium stygium Sw.—Labrador: Carol L., Kallio.

AULACOMNIACEAE

Aulacomnium palustre (Hedw.) Schwaegr.—Quebec: Knob L., Graysen

5014 (with *Hylocomium splendens*). Labrador: Wabush, *Kallio*. Carol L., *Kallio*. Northwest R., *Kallio*. Twin Falls, *Kallio*.

Aulaconium turgidum (Wahl.) Schwaegr.—Labrador: E. of Ruth L., *Kallio*. Irony Mt., *Kallio*. Cape Caribou, *Kallio*.

MEESIACEAE

Paludella squarrosa (Hedw.) Brid.—Quebec: Knob L., *Grayson* 5026, 5073. Labrador: Grand Falls, *Kallio*. Little L., *Kallio*. Carol L., *Kallio*. Alexander L., *Schofield* 833.

Meesia tristicha BSG—Labrador: Carol L., *Kallio*.

CATOSCOPIACEAE

Catoscopium nigrum (Hedw.) Brid.—Labrador: Irony Mt., *Kallio*.

BARTRAMIACEAE

Bartramia ithyphylla Brid.—Labrador: Grand Falls, *Kallio*.

Bartramia pomiformis Hedw.—Labrador: Bonnel Creek, *Kallio*. Cape Caribou, *Kallio*.

Philonotis caespitosa Jur.—Labrador: Little L., *Kallio*. Carol L., *Kallio*.

Philonotis fontana (Hedw.) Brid.—Labrador: Cape Caribou, *Kallio*.

ORTHOTRICHACEAE

Amphidium lapponicum (Hedw.) Schimp.—Labrador: Between Northwest R. and Goose R., *Kallio*. Bonnel Creek, *Kallio*.

Amphidium mougeotii (BSG) Schimp.—Labrador: Cape Caribou, *Kallio*.

Orthotrichum anomalum Hedw.—Labrador: Slimy L., *Kallio*.

Orthotrichum obtusifolium Brid.—Labrador: Unknown R., *Kallio*.

Orthotrichum speciosum Nees ex Sturm—Labrador: Scott Falls, *Kallio*.

Ulota curvifolia (Wahl.) Brid.—Labrador: Bonnel Creek, *Kallio*.

FONTINALACEAE

Fontinalis antipyretica Hedw. var. *gigantea* (Sull.) Sull.—Labrador: Little L., *Kallio*.

Fontinalis dalecarlica Schimp. ex BSG—Labrador: Traverspine R., *Schofield*.—The specimen was not seen; it was cited in the recent monograph by Welch (1961).

Dichelyma falcatum (Hedw.) Myr.—Labrador: Unknown R., *Kallio*. Scott Falls, *Kallio*.

CLIMACIACEAE

Climacium dendroides (Hedw.) Web. & Mohr—Labrador: Little L., *Kallio*. Unknown R., *Kallio*. Grand Falls, *Kallio*. Traverspine R., *Schofield* 720. Goose Bay, *Schofield* 40, 705. Mud L., *Kallio*.

HEDWIGIACEAE

Hedwigia ciliata (Hedw.) P.-Beauv.—Labrador: Between Northwest R. and Goose R., *Kallio*. Cape Caribou, *Kallio*.

NECKERACEAE

Neckera pennata Hedw.—Labrador: Between Northwest R. and Goose R., *Kallio*. Cape Caribou, *Kallio*. Var. *oligocarpa* (Bruch ex C. J. Hartm.) Grout—Labrador: Cape Caribou, *Kallio*.

THELIACEAE

Myurella julacea (Schwaegr.) BSG—Labrador: Slimy L., *Kallio*. Between Esker and Twin Falls, *Kallio*.

Myurella tenerrima (Brid.) Lindb.—Labrador: Slimy L., *Kallio*.

Pterigynandrum filiforme Hedw.—Labrador: Cape Caribou, *Kallio*.

LESKEACEAE

Leskeella nervosa (Brid.) Loeske—Labrador: Grand Falls, *Kallio*.

THUIDIACEAE

Abietinella abietina (Hedw.) Fl.—Labrador: Slimy L., *Kallio*.

Helodium blandowii (Web. & Mohr) Warnst.—Labrador: Little L., *Kallio*. Goose Bay, Schofield 43.

AMBLYSTEGIACEAE

Campylium hispidulum (Brid.) Mitt.—Labrador: Goose Bay, Schofield 50. Northwest River, *Kallio*. Unknown River, *Kallio*.

Campylium stellatum (Hedw.) C. Jens.—Labrador: Carol L., *Kallio*. Scott Falls, *Kallio*. Between Esker and Twin Falls, *Kallio*. Grand Falls, *Kallio*.

Amblystegium varium (Hedw.) Lindb.—Labrador: Unknown R., *Kallio*.

Drepanocladus aduncus (Hedw.) Warnst. var. *polycarpus* (Bland. ex Voigt) Roth—Labrador: Carol L., *Kallio*.

Drepanocladus badius (C. J. Hartm.) Roth—Quebec: Knob L., Grayson 5023. Labrador: Wabush, *Kallio*.

Drepanocladus exannulatus (BSG) Warnst.—Quebec: Knob L., *Kallio*. Labrador: Wabush, *Kallio*. Northwest R., *Kallio*. Little L., *Kallio*. Var. *alpinus* (Grav.) Wijk & Marg.—Labrador: Goose Bay, Schofield 51.

Drepanocladus fluitans (Hedw.) Warnst.—Labrador: Unknown R., *Kallio*.

Drepanocladus revolvens (Sw.) Warnst.—Quebec: Knob L., Grayson 5005a. Labrador: Carol L., *Kallio*. Scott Falls, *Kallio*. Grand Falls, *Kallio*. Between Esker and Twin Falls, *Kallio*.

Drepanocladus uncinatus (Hedw.) Warnst.—Labrador: Carol L., *Kallio*. Mt. between Ruth L. and Bean L., *Kallio*. Goose Bay, Schofield 5, 50A, 713. Goose R., Schofield 55, 800, 801. Between Northwest R. and Goose R., *Kallio*. Traverspine R., Schofield 709, 719 (with *Mnium spinulosum*), 720 (with *Climacium dendroides*), 722 (with *Hypnum lindbergii*), 723, 728. Unknown R., *Kallio*. Scott Falls, *Kallio*. Thomas Falls, *Kallio*. Grand Falls, *Kallio*. Cape Caribou, *Kallio*.

Calliergidium pseudostramineum (C. M.) Grout—Labrador: Traverspine R., Schofield 707.

Calliergon cordifolium (Hedw.) Kindb.—Labrador: Northwest R., *Kallio*. Little L., *Kallio*. Bonnel Creek, *Kallio*. Mud L., *Kallio*.

Calliergon sarmentosum (Wahl.) Kindb.—Quebec: Greenbush L., Grayson 6002, 6003. Labrador: Wabush, *Kallio*. Carol L., *Kallio*. Scott Falls, *Kallio*. Grand Falls, *Kallio*.

Calliergon stramineum (Brid.) Kindb.—Quebec: Knob L., Grayson 5018. Labrador: Carol L., *Kallio*. Unknown R., *Kallio*. Northwest R., *Kallio*. Little L., *Kallio*. Grand Falls, *Kallio*. Alexander L., Schofield 833 (with *Pahudella squarrosa*). Goose Bay, Schofield 658 (with *Chiloscyphus pallescens*).

Scorpidium scorpioides (Hedw.) Limpr.—Labrador: Wabush, *Kallio*. Carol L., *Kallio*. Grand Falls, *Kallio*. Between Esker and Twin Falls, *Kallio*.

BRACHYTHECIACEAE

Tomenthypnum nitens (Hedw.) Loeske—Quebec: Knob L., *Grayson* 5000, 5059, *Kallio*. Labrador: Wabush, *Kallio*. Carol L., *Kallio*. Scott Falls, *Kallio*. Between Esker and Twin Falls, *Kallio*. Between Northwest R. and Goose R., *Kallio*.

Brachythecium plumosum (Hedw.) BSG—Labrador: Cape Caribou, *Kallio*. Traversspine R., *Schofield* 694 (with *Grimmia alpicola* var. *rivularis*).

Brachythecium reflexum (Starke ex Web. & Mohr) BSG—Labrador: Northwest R., *Kallio*. Unknown R., *Kallio*. Goose R., *Schofield* 56 (with *Plagiothecium turfaceum*), 57.

Brachythecium rivulare BSG—Labrador: Little L., *Kallio*.

Brachythecium rutabulum (Hedw.) BSG—Labrador: Northwest R., *Montgomery*. Traversspine R., *Schofield* 716. Goose Bay, *Schofield* 39, 54.

Brachythecium velutinum (Hedw.) BSG—Labrador: Slimy L., *Kallio*.

Bryhnia graminicolor (Brid.) Grout—Labrador: Grand Falls, *Kallio*.

Bryhnia novae-angliae (Sull. & Lesq. ex Sull.) Grout—Labrador: Grand Falls, *Kallio*.

ENTODONTACEAE

Pleurozium schreberi (Brid.) Mitt.—Quebec: Knob L., *Grayson* 5037. Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Wabush R., *Kallio*. Carol L., *Kallio*. Northwest R., *Kallio*. Unknown R., *Kallio*. Twin Falls, *Kallio*. Cape Caribou, *Kallio*. Goose Bay, *Schofield* 13, *Senn* 3335, 3346.

PLAGIOTHECIACEAE

Plagiothecium denticulatum (Hedw.) BSG—Labrador: Northwest R., *Kallio*. Var. *tenellum* BSG—Labrador: Between Northwest R. and Goose R., *Kallio*. Goose Bay, *Schofield* 712 (with *Lepidozia reptans*).

Plagiothecium pulchellum (Hedw.) BSG—Labrador: Slimy L., *Kallio*. Mt. between Ruth L. and Bean L., *Kallio*. Bonnel Creek, *Kallio*. Scott Falls, *Kallio*.

Plagiothecium turfaceum Lindb.—Labrador: Goose Bay, *Schofield* 711. Goose R., *Schofield* 56. Traversspine R., *Schofield* 715.

Plagiothecium sylvaticum (Brid.) BSG—Labrador: Cape Caribou, *Kallio*. Var. *roeseanum* (BSG) Lindb. ex C. Hartm.—Labrador: Cape Caribou, *Kallio*.

HYPNACEAE

Platydictya jungermannioides (Brid.) Crum—Labrador: Between Northwest R. and Goose R., *Kallio*.

Pylaisiella polyantha (Hedw.) Grout—Labrador: Scott Falls, *Kallio*.

Pylaisiella selwynii (Kindb.) Crum, Steere & Anders.—Labrador: Scott Falls, *Kallio*.

Hypnum cupressiforme Hedw.—Labrador: Slimy L., *Kallio*. Between Esker and Twin Falls, *Kallio*.

Hypnum fastigiatum Funck ex Brid.—Labrador: Slimy L., *Kallio*.

Hypnum fertile Sendt.—Labrador: Between Northwest R. and Goose R., *Kallio*. Cape Caribou, *Kallio*.

Hypnum lindbergii Mitt.—Labrador: Little L., *Kallio*. Unknown R., *Kallio*. Scott Falls, *Kallio*. Hamilton R., *Kallio*. Traverspine R., *Schofield* 722. Mud L., *Kallio*.

Hypnum reptile Mx.—Labrador: Between Northwest R. and Goose R., *Kallio*.

Hypnum vaucheri Lesq.—Labrador: Slimy L., *Kallio*. Between Esker and Twin Falls, *Kallio*.

Ptilium crista-castrensis (Hedw.) DeNot.—Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Carol L., *Kallio*. Bonnel Creek, *Kallio*. Unknown R., *Kallio*. Between Northwest R. and Goose R., *Kallio*. Cape Caribou, *Kallio*. Traverspine R., *Schofield* 725 (with *Dicranum fuscescens*). Goose Bay, *Schofield* 8, 37. Lake Alexander, *Senn* 3402.

RHYTIDIACEAE

Rhytidium rugosum (Hedw.) Kindb.—Labrador: Thomas Falls, *Kallio*. Twin Falls, *Kallio*.

Rhytidiadelphus squarrosus (Hedw.) Warnst.—Labrador: Grand Falls, *Kallio*. Traverspine R., *Schofield* 720 (with *Climacium dendroides*). Mud L., *Kallio*.

Rhytidiadelphus triquetrus (Hedw.) Warnst.—Labrador: Scott Falls, *Kallio*. Twin Falls, *Kallio*. Grand Falls, *Kallio*. Goose Bay, *Schofield* 27.

HYLOCOMIACEAE

Hylocomium pyrenaicum (Spruce) Lindb.—Labrador: Northwest R., *Kallio*. Unknown R., *Kallio*. Grand Falls, *Kallio*. Twin Falls, *Kallio*.

Hylocomium splendens (Hedw.) BSG—Quebec: Gerin Mt., *Viereck* 705. Knob L., *Grayson* 5014, *Kallio*. Labrador: Between Northwest R. and Goose R., *Kallio*. Unknown R., *Kallio*. Twin Falls, *Kallio*. Cape Caribou, *Kallio*. Goose Bay, *Schofield* 11.

Hylocomium umbratum (Hedw.) BSG—Labrador: Grand Falls, *Kallio*. Goose Bay, *Schofield* 41.

TETRAPHIDACEAE

Tetraphis pellucida Hedw.—Labrador: Between Northwest R. and Goose R., *Kallio*. Goose Bay, *Schofield* 7, 32.

POLYTRICHACEAE

Atrichum undulatum (Hedw.) P.-Beauv.—Labrador: Unknown R., *Kallio*.

Pogonatum alpinum (Hedw.) Röhl.—Labrador: Scott Falls, *Kallio*. Thomas Falls, *Kallio*. Cape Caribou, *Kallio*.

Pogonatum capillare (Mx.) Brid.—Labrador: Between Northwest R. and Goose R., *Kallio*. Bonnel Creek, *Kallio*. Goose Bay, *Schofield* 651, 758. Terrington Basin, *Schofield* 14, 18.

Pogonatum urnigerum (Hedw.) P.-Beauv.—Labrador: Northwest R., *Kallio*.

Polytrichum commune Hedw.—Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Terrington Basin, *Schofield* 62 (with *P. piliferum*), 649. Goose Bay, *Schofield* 30.

Polytrichum juniperinum Hedw.—Labrador: Irony Mt., *Kallio*. Grand Falls, *Kallio*. Terrington Basin, *Schofield* 12, 16, 17, 19, 21, 22, 23, 60, 61, 62 (with *P. piliferum*). Goose Bay, *Senn* 3365. Goose R., *Senn* 3380A. Var. *gracilius*

Wahl.—Quebec: Knob L., *Grayson* 5044, *Kallio*. Labrador: Mt. between Ruth L. and Bean L., *Kallio*. Northwest R., *Montgomery* 3.

Polytrichum piliferum Hedw.—Quebec: Knob L., *Grayson* 5020. Labrador: Between Northwest R. and Goose R., *Kallio*. Goose Bay, *Schofield* 10, 758 (with *Pogonatum capillare*). Terrington Basin, *Schofield* 59, 62 (with *P. piliferum*).

Polytrichum swartzii C. J. Hartm.—Labrador: Little L., *Kallio*.

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BRYOPHYTES OF OWEN SOUND AND THE BRUCE PENINSULA, ONTARIO

BY HOWARD CRUM

RÉSUMÉ

Communication des comtés de Bruce et de Grey: 130 mousses et 18 hépatiques. Cette liste, établie en grande partie d'après les herbiers constitués par l'auteur en 1961, repose également sur plusieurs autres collections, montées dans la région. Le tout représente un tableau assez complet de la flore des muscinées.

The mosses of Owen Sound and the Bruce Peninsula of Ontario are interesting as an unusually rich assemblage of disjuncts from the calciphilous flora of the far north and the Canadian Rocky Mountains. Many of the species are distinctly rare in North America, and a large number reach their southern limits of distribution here or in a few other places fringing the Great Lakes and the St. Lawrence River. The area is well known to tourists for its scenic beauty and to botanists for its wealth of undisturbed habitats, including moist ravines and gorges, sheer cliffs, waterfalls, white cedar bogs, and open fens.

The bryoflora has attracted a fair amount of interest since 1871 when John Macoun spent his holidays there as a guest at "Royston Park" near Owen Sound. Mrs. Jessie Roy, according to Macoun's *Autobiography*, "was an accomplished botanist and corresponded with all the leading Scotch botanists," and she knew where the most interesting plants grew. Macoun collected many interesting mosses and sent them for determination to T. P. James, who (with Leo Lesquereux) was then preparing the *Manual of the Mosses of North America*. Macoun's collections, preserved in the National Herbarium of Canada at Ottawa, are recorded in his *Catalogue of Canadian Plants* (1892, 1902), where records from three other visits, in 1874, 1890, and 1901, are also given.

The greatest contribution to our knowledge of the mosses of Bruce and Grey counties was made by Eugene A. Moxley, a diligent and intelligent amateur, resident in Owen Sound for many years. His discoveries were publicized between 1925 and 1937 in a series of nature notes in *The Bryologist*. The style of writing, illustrated by such titles as "The bryophyte beautiful" and "Beside a waterfall," is somewhat offensive and obscures the fact that Moxley was an excellent collector and a good bryologist who was able to name his collections well at a time when North American mosses were very poorly understood. He summarized his knowledge of the local moss flora in two annotated catalogues (1928 and 1933). His herbarium is now kept at the University of Toronto; a good series of duplicates of his most interesting discoveries is to be found in the National Herbarium.

Clarence H. Hand, who formerly taught school in Chatham, Ontario, spent a great deal of time in the area and collected extensively with Moxley, and also independently, in both Bruce and Grey counties. In 1938 he and Moxley led a foray of the Sullivant Moss Society to the Bruce Peninsula and the vicinity of Owen Sound. An account of the foray was published by Conard (1938). Mr. Hand recently donated a large series of his excellent collections to the National Herbarium. Roy F. Cain of the University of Toronto and Harry Williams of

Millbrook, Ontario, have also made important, but less extensive, collections in the area.

In 1961 I spent three weeks in Grey and Bruce counties. The following catalogue of 19 liverworts and 223 mosses is based primarily on my own collections, but I have added to it all other species whose presence I have been able to verify. I am grateful to Dr. Roy F. Cain of the University of Toronto (TRTC) and Dr. Robert L. Hulbary of the State University of Iowa (IA) for the generous loan of specimens not represented in duplicate in the National Herbarium. Although I have not attempted to confirm all records in the literature, comparison with the lists published by Moxley shows that the following is a nearly complete record of the moss flora.

HEPATICAEE

PTILIDIACEAE

Ptilidium pulcherrimum (Web.) Hampe—Bruce Co.: On shaded limestone cliff, Dunks Bay, 11429.

Blepharostoma trichophyllum (L.) Dum.—Bruce Co.: In recesses of shaded limestone cliff, Dunks Bay, 11423.

Trichocolea tomentella (Ehrh.) Dum.—Grey Co.: On wet humus under spruce, fen in late stage of succession, Berkeley, 11265.

CEPHALOZIACEAE

Nowellia curvifolia (Dicks.) Mitt.—Grey Co.: On old logs, Owen Sound, J. Macoun, September 16, 1890.

LEPIDOZIACEAE

Bazzania trilobata (L.) S. F. Gray—Grey Co.: On soil at base of stump, Eugenia Falls, 11562.

HARPANTHACEAE

Lophocolea minor Nees—Grey Co.: On very rotten stump, Jones Falls, 11077.

Geocalyx graveolens (Schr.) Nees—Grey Co.: On damp humus under spruce, fen in late stage of succession, Berkeley, 11262.

JUNGERMANNIACEAE

Leiocolea badensis (Gottsche) Joerg.—Grey Co.: On limestone cliff, S. of Craigleith, R. F. Cain 4254 (TRTC).

Jungermannia cordifolia Hook.—Grey Co.: On stones in a river, Owen Sound, J. Macoun, July 27, 1871. On rocks below Jones Falls, J. Macoun, July 26, 1871.

Jamesoniella autumnalis (DC.) St.—Grey Co.: On dry log, Eugenia Falls, 11564.

PLAGIOCHILACEAE

Plagiochila asplenoides (L.) Dum.—Grey Co.: On damp, rotten log, cedar swamp, Williamsford, 11335 (with *Mnium orthorrhynchum*). Bruce Co.: On base of shaded limestone cliff, Dunks Bay, 11428.

SCAPANIACEAE

Scapania gymnostomophila Kaal.—Bruce Co.: On dolomite cliff, Little Cove, H. Williams 1619.

PORELLACEAE

Porella pinnata L.—Grey Co.: On stones in creek, Roy farm, Owen Sound, J. Macoun, July 22, 1871.

Porella platyphylla (L.) Lindb.—Grey Co.: On ledge of deeply shaded limestone cliff, Jones Falls, 11051. On roots of elm, Eugenia Falls, 11574. Bruce Co.: On shaded limestone, 3 mi. NE. of Mallory Beach, 11379.

RADULACEAE

Radula complanata (L.) Dum.—Grey Co.: On dry, shaded limestone cliff, Jones Falls, 11059. On moist stones, near Meaford, C. H. Hand 5 (with *Brachythecium populeum*).

FRULLANIACEAE

Frullania eboracensis Gottsche—Grey Co.: On *Betula*, Owen Sound, E. A. Moxley, June 1926, October 31, 1926 (TRTC). On tree, Jones Falls, J. Macoun, July 26, 1871 (with *Pylaisiella polyantha*).

MARCHANTIACEAE

Preissia quadrata (Scop.) Nees—Bruce Co.: On moist limestone at edge of pool, cedar swamp, Crane River (N. of Miller Lake), 11461.

Marchantia polymorpha L.—Grey Co.: On limestone cliff, S. of Craigeleith, R. F. Cain 4165 (TRTC).

Conocephalum conicum (L.) Dum.—Grey Co.: Inglis Falls, H. H. Brown, June 28, 1942 (TRTC); Meaford, L. H. Beamer, May 12, 1940 (TRTC); on wet limestone, S. of Craigeleith, R. F. Cain 4164 (TRTC). On limestone, Oxenden, M. E. Hunter 4151 (TRTC).

MUSCI

SPHAGNACEAE

Sphagnum capillaceum (Weiss) Schrank—Grey Co.: On rotten log in spring, Eugenia Falls, 11568. Bruce Co.: On bank of dried-up swampy place in forest, Tobermory, 11388. On humus in cedar swamp, Pine Tree Harbour, 11469. Bruce Co.: In bog, Southampton, J. Macoun, August 20, 1901.

Sphagnum centrale C. Jens.—Grey Co.: At edge of Youngs Lake, E. A. Moxley, July 1924 (TRTC). Bruce Co.: In dried-up swampy area in forest, Tobermory, 11383.

Sphagnum fimbriatum Wils. ex Hook.—Grey Co.: In open fen, Markdale, 11243.

Sphagnum fuscum (Schimp.) Klinggr.—Grey Co.: In open fen, Markdale, 11243 (with *S. fimbriatum*), 11247. Youngs Lake, McColl, Summer 1925 (TRTC).

Sphagnum magellanicum Brid.—Bruce Co.: In bog, Southampton, J. Macoun, August 20, 1901.

Sphagnum quinquesarium (Lindb. ex Braithw.) Warnst.—Grey Co.: In bog, Meaford, M. V. McCulloch 618 (TRTC).

Sphagnum recurvum P.-Beauv.—Bruce Co.: In bog, Southampton, J. Macoun, August 20, 1901 (with *S. capillaceum*).

Sphagnum squarrosum Sw. ex Crome—Bruce Co.: In bog, Sauble Beach, E. A. Moxley, May 14, 1925 (TRTC). Au Sauble, McColl (TRTC).

Sphagnum warnstorffianum DuRietz—Grey Co.: In open fen, Markdale, 11239, 11251, 11252. Bruce Co.: In bog, Tobermory, E. A. Moxley, June 1924 (TRTC).

FISSIDENTACEAE

Fissidens adianthoides Hedw.—Grey Co.: On rotten wood in cedar swamp, Massie, 11190. On log in hardwood swamp, 4½ mi. NE. of Kimberley, 11547. Bruce Co.: In crevice of limestone, Hay Bay, 11396. On damp humus in cedar swamp, Crane River (N. of Miller Lake), 11459.

Fissidens bryoides Hedw.—Grey Co.: On dry or moist, shaded limestone ledge, Jones Falls, 11061 ("F. viridulus"), 11062 ("F. minutulus"). On deeply shaded limestone cliff, 3 mi. E. of Owen Sound, 11131 (with *Seligeria campylopoda*), 11132 (both "F. minutulus"). On shaded limestone, Walters Falls, 11139, 11171 (both "F. exiguus"). On limestone, Wiarton, 11272 ("F. minutulus"). On damp pebble, 5 mi. NE. of Leith, 11313 ("F. exiguus"). On damp, shaded soil, Owen Sound, 11347 ("F. viridulus"). On bare soil, steep bank of gully, Meaford, 11521 ("F. viridulus"). Bruce Co.: On dry, shaded limestone, 3 mi. NE. of Mallory Beach, 11366 ("F. minutulus").

Fissidens bushii (Card. & Thér.) Card. & Thér.—Grey Co.: On soil among maples, Jones Falls, 11069. On shaded soil, hardwood forest, 2 mi. W. of Woodford, 11497.

Fissidens cristatus Wils. ex Mitt.—Grey Co.: On soil among white birches, Jones Falls, 11079. On very rotten stumps, hardwood swamp, Jackson, 11106. On deeply shaded limestone, Walters Falls, 11153. On base of old stump, Eugenia Falls, 11234. On shaded, dry, rotten stump, dry *Thuja* forest, Cameron Point, 11282. On wet, rotten cedar logs and soil over them, Williamsford, 11342A. On limestone, hardwood forest, 2 mi. W. of Woodford, 11498. On wet soil, cedar swamp, Meaford, 11515. On rather dry crevice of limestone boulder in river, Inglis Falls, 11623. Bruce Co.: On damp humus, cedar swamp, Crane River (N. of Miller Lake), 11463.

Fissidens fontanus (B.-Pyl.) Steud.—Grey Co.: Submerged at base of Inglis Falls, C. H. Hand & E. A. Moxley 118.

Fissidens grandifrons Brid.—Grey Co.: On wet limestone in splash of Inglis Falls, 11018. On wet limestone in trickle from Jones Falls, 11050. On wet limestone in intermittent brook, Walters Falls, 11159. On calcareous mud, partially submerged, Eugenia Falls, 11225. On submerged limestone in creek, Meaford, 11517.

Fissidens obtusifolius Wils.—Grey Co.: In moist depressions in limestone boulder in river below Inglis Falls, 11600, 11600A.

Fissidens osmundioides Hedw.—Grey Co.: On deeply shaded limestone cliff, Inglis Falls, 11007. On humus of shaded hummock, fen, near Markdale, 11238.

Fissidens taxifolius Hedw.—Grey Co.: On very rotten stump, hardwood swamp, Jackson, 11107. On shaded soil, hardwood forest, 2 mi. W. of Woodford, 11490.

DITRICHACEAE

Ditrichum flexicaule (Schwaegr.) Hampe—Grey Co.: On shaded humus

(probably a late snow patch), dry *Thuja* forest at shore, Cameron Point, 11257. Bruce Co.: On thin soil over limestone, in sun, dry forest, Tobermory, 11387 (with *Bryum stenotrichum*). On soil in open area (probably a late snow patch) cedar swamp, Crane River (N. of Miller Lake), 11453.

Ditrichum pallidum (Hedw.) Hampe—Grey Co.: On soil among sugar maples, Jones Falls, 11076.

Ceratodon purpureus (Hedw.) Brid.—Grey Co.: On clay over granite, roadside, 3 mi. N. of Eugenia, 11205. On soil of roadbank, Meaford, 11506 (with *Brachythecium salebrosum*), 11509.

Distichium capillaceum (Hedw.) BSG—Bruce Co.: On dry, shaded limestone ledge, Tobermory, 11385. On dry, shaded limestone cliff, Dunks Bay, 11427.

Distichium inclinatum (Hedw.) BSG—Bruce Co.: On limestone and humus in sheltered niches, Hay Bay, 11401. In shaded crevices and ledge of limestone cliff, Dunks Bay, 11415 (with *Gymnostomum aeruginosum*), 11432.

SELIGERiaceae

Seligeria calcarea (Hedw.) BSG—Grey Co.: On limestone, Owen Sound. J. Macoun, August 10, 1874, E. A. Moxley, July 4, 1927 (with *S. donniana*).

Seligeria campylopoda Kindb. ex Macoun & Kindb.—Grey Co.: On limestone, bed of Indian River, J. Macoun, July 27, 1871. On damp limestone, Owen Sound, J. Macoun, September 1890, E. A. Moxley, July 16, 1930. On dry, shaded limestone, Inglis Falls, 11000, 11033. On deeply shaded limestone cliff, 3 mi. E. of Owen Sound, 11131. On deeply shaded limestone, Walters Falls, 11140. On dry, shaded limestone, Eugenia Falls, 11220, 11232, 11557. On dry limestone in open forest, 5 mi. NE. of Leith, 11326. On deeply shaded limestone, Indian Falls, 11351. Bruce Co.: On dry, shaded limestone, 3 mi. NE. of Mallory Beach, 11362, 11368, 11377, 11385.

Seligeria donniana (Sm.) C. M.—Grey Co.: In fissures of damp limestone, West Hill, Owen Sound, E. A. Moxley, July 4, 1927. Bruce Co.: On damp, shaded crevices of limestone cliff, Sky Lake, 11126. On shaded limestone outcrop in cedar swamp, Crane River (N. of Miller Lake), 11457.

DICRANACEAE

Dicranella heteromalla (Hedw.) Schimp.—Grey Co.: On soil, steep bank in woods, Owen Sound, 11346. On disturbed soil, mounds and banks in woods, West Hill, Owen Sound, E. A. Moxley, April 24, 1931, May 1931, May 16, 1931 (TRTC, as *Ditrichum pusillum*). On soil, hardwood forest, 2 mi. W. of Woodford, 11494. On soil, Eugenia Falls, 11559.

Dicranella schreberiana (Hedw.) Schimp. var. *robusta* (Schimp.) Braithw.—Grey Co.: On earth and on stones in brooks, Owen Sound, J. Macoun, August 5, 1871, July 27, 1874.

Dicranella varia (Hedw.) Schimp.—Grey Co.: On clayey soil in crevice of dry, exposed limestone cliff, roadside, 3 mi. E. of Owen Sound, 11130. On clay of roadbank, 3 mi. N. of Eugenia, 11208. On soil of roadbank, Meaford, 11510, 11511. On clay banks, Harrison Park, Owen Sound, E. A. Moxley, Jan. 3, 1926, June 3, 1928 (TRTC, as *D. rufescens*).

Paraleucobryum longifolium (Lindb.) Loeske—Grey Co.: On rock, West Hill, Owen Sound, E. A. Moxley, October 18, 1926 (TRTC, with *Ulota hutchinsiae*).

Dichodontium pellucidum (Hedw.) Schimp.—Bruce Co.: On humus at base of limestone cliff, Sky Lake, 11127b.

Dicranoweisia crispula (Hedw.) Lindb. ex Milde—Grey Co.: On boulder below Inglis Falls, Owen Sound, E. A. Moxley, August 22, 1925 (TRTC).

Oncophorus wahlenbergii Brid.—Grey Co.: On damp log in trickle of spring, Eugenia Falls, 11569. On very rotten stump, cedar swamp, Meaford, 11516. Bruce Co.: On rotten logs in cedar swamp, Crane River (N. of Miller Lake), 11456. On rotten log, cedar swamp, Pine Tree Harbour, 11516.

Dicranum drummondii C. M.—Grey Co.: On shaded humus, dry *Thuja* forest along shore, Cameron Point, 11284, 11290, 11293.

Dicranum flagellare Hedw.—Grey Co.: On rotten stump, hardwood swamp, Jackson, 11093. On rotten log, fen in late stage of succession, Berkeley, 11263. On dry, rotten log, dry *Thuja* forest along shore, Cameron Point, 11281. On top of very rotten stump, Eugenia Falls, 11563 (with *Isopterygium turfaceum*). Bruce Co.: On dry, rotten log, Dunks Bay, 11438.

Dicranum fulvum Hook.—Grey Co.: On rock, West Hill, Owen Sound, E. A. Moxley, October 18, 1926 (TRTC, with *Ulota hutchinsiae*). On granite rock, hardwood forest, 2 mi. W. of Woodford, 11485, 11491.

Dicranum montanum Hedw.—Grey Co.: On bark at base of hemlock, Inglis Falls, 11016. On bark at base of sugar maple, Jones Falls, 11054 (with *D. viride*). On rotten log, dry *Thuja* forest along shore, Cameron Point, 11291. Bruce Co.: On dry cedar log, Dunks Bay, 11435.

Dicranum polysetum Sw.—Bruce Co.: On dry, shaded humus in forest, Dunks Bay, 11426. On damp humus, open fen, Pine Tree Harbour, 11476.

Dicranum scoparium Hedw.—Grey Co.: On wood humus, Eugenia Falls, 11227. On dry, shaded hummock, fen, Markdale, 11240. On shaded humus, dry *Thuja* forest along shore, Cameron Point, 11286, 11292. Bruce Co.: On shaded humus in woods near shore, Hay Bay, 11400. On dry humus in forest, Dunks Bay, 11431.

Dicranum viride (Sull. & Lesq. ex Sull.) Lindb.—Grey Co.: On dry, shaded log, Inglis Falls, 11005. On bark at base of sugar maple, Jones Falls, 11054. On dry, rotten wood, Eugenia Falls, 11231.

LEUCOBRYACEAE

Leucobryum glaucum (Hedw.) Ångstr. ex Fries—Grey Co.: In woods, West Hill, Owen Sound, E. A. Moxley, September 22, 1924, October 18, 1926 (TRTC). Owen Sound, E. A. Moxley, October 9, 1938 (TRTC). Bruce Co.: Warner Bay, R. F. Cain 4845 (TRTC).

ENCALYPTACEAE

Encalypta rhaptocharpa Schwaegr.—Bruce Co.: In crevices of dry, shaded, limestone cliff, Dyer Bay, 11480.

Encalypta procera Bruch—Grey Co.: In dry crevices and ledges of limestone cliff, Jones Falls, 11058, 11072. On soil in ledges of limestone cliff, roadside, 6 mi. E. of Owen Sound, 11134. In crevices of deeply shaded limestone cliff, Walters Falls, 11162. On shaded limestone, Eugenia Falls, 11233 (with *Tortella tortuosa*). Bruce Co.: On shaded crevice of limestone cliff, Sky Lake, 11120. On shaded limestone, 3 mi. NE. of Mallory Beach, 11360. On shaded limestone cliff, Dunks Bay, 11424.

POTTIACEAE

Weissia controversa Hedw.—Grey Co.: On soil among maples, Jones Falls, 11069 (with *Fissidens bushii*). Bruce Co.: On dry calcareous soil among rocks in dry meadow, Pine Tree Harbour, 11478.

Gymnostomum aeruginosum Sm.—On dry or damp, exposed or shaded limestone cliffs and boulders, Inglis Falls, 11010, 11031, 11035, 11613, 11616, 11617. On shaded, moist to wet limestone boulders, Walters Falls, 11142, 11145, 11150, 11151. On moist, shaded limestone boulders, Eugenia Falls, 11222, 11228, 11558. On damp, shaded limestone, Indian Falls, 11354. Bruce Co.: On moss humus at base of limestone cliff, Sky Lake, 11127 (with *Platydictya jungermannioides*). On shaded limestone cliffs, 3 mi. NE. of Mallory Beach, 11363. On limestone, in deep niche, Tobermory, 11409. In shaded crevices of limestone cliff, Dunks Bay, 11415.

Gymnostomum recurvirostrum Hedw.—Grey Co.: In damp, shaded crevice of limestone cliff, Jones Falls, 11060. In wet crevices of limestone cliff, Walters Falls, 11157. Bruce Co.: On damp, shaded limestone cliff, Sky Lake, 11121. In crevice of limestone at shore, Hay Bay, 11399.

Gyroweisia reflexa (Brid.) Schimp.—Grey Co.: On limestone, West Hill, Owen Sound, E. A. Moxley, May 24, 1934.

Tortella fragilis (Hook. ex Drumm.) Limpr.—Grey Co.: On damp soil among rocks on shingle beach, Cameron Point, 11276. Bruce Co.: On damp humus over limestone at edge of pool, cedar swamp, Crane River (N. of Miller Lake), 11452.

Tortella humilis (Hedw.) Jenn.—Grey Co.: On very rotten stump, hardwood swamp, Jackson, 11096. On base of white cedar in swamp, Williamsford, 11336.

Tortella inclinata (R. Hedw.) Limpr.—Bruce Co.: On sand, Sauble Beach. C. H. Hand & E. A. Moxley 591.

Tortella tortuosa (Hedw.) Limpr.—Grey Co.: On shaded limestone, Inglis Falls, 11009. On rotten wood in white cedar swamp, Massie, 11187. On shaded limestone, Eugenia Falls, 11233. On damp soil among rocks, sedge meadow near shore, Leith, 11300. On bark at base of white cedar and on rotten logs, cedar swamp, Williamsford, 11339, 11340. Bruce Co.: On dry, shaded limestone, Dunks Bay, 11420.

Hyophila involuta (Hook.) Jaeg. & Sauerb.—Grey Co.: In moist depressions in limestone boulders in river, Inglis Falls, 11600 (with *Fissidens obtusifolius*), 11607. On damp limestone at edge of creek, Jones Falls, 11632.

Didymodon rigidulus Hedw.—Grey Co.: On dry or moist limestone boulders, Inglis Falls, 11033 (with *Seligeria campylopoda*), 11603, 11612, 11621. E. A. Moxley, August 22, 1925 (TRTC). On wet limestone rock in brook, Eugenia Falls, 11556.

Didymodon tophaceus (Brid.) Lisa—Grey Co.: On limestone in river, Eugenia, C. H. Hand 672. Tufa-forming in wet crevice of limestone rock in stream, Eugenia Falls, 11229. On limestone in spray from flume, Walters Falls, C. H. Hand & E. A. Moxley 673. On limestone and shale of cliff wet by dripping, Fairmount, 11532. On wet limestone in Sydenham River near Inglis Falls, E. A. Moxley, January 7, 1928. On limestone above iron spring, Harrison Park, Owen Sound, E. A. Moxley & C. H. Hand 511.

Bryoerythrophyllum recurvirostrum (Hedw.) Chen—Grey Co.: On soil,

deeply shaded bank of ravine, Leith, 11302 (with *Myurella sibirica*), 11304. Bruce Co.: On soil on ledge of limestone cliff and on moss humus at its base, Sky Lake, 11124, 11127 (with *Platydictya jungermannioides*). In crevice of limestone outcrop, dry forest, Tobermory, 11393. On humus on dry, shaded limestone cliff, Dunks Bay, 11422. On side of damp, rotten log in swamp, Sauble Falls, 11583 (with *Amblyodon dealbatus*).

Barbula convoluta Hedw.—Grey Co.: On soil in crevice of a dry, sunny limestone rock and on calcareous soil in stubble field, 2 mi. S. of Chatsworth, 11329.

Barbula fallax Hedw.—Grey Co.: On soil in ledges of limestone cliff, roadside, 6 mi. E. of Owen Sound, 11134 (with *Encalypta procera*), 11135. On exposed, calcareous soil in pasture, 2 mi. S. of Chatsworth, 11331. On roadside soil, Meaford, 11508, 11511 (with *Dicranella varia*).

Barbula unguiculata Hedw.—Grey Co.: On calcareous clay at roadside, 3 mi. N. of Eugenia, 11199, 11215. On roadside soil, 5 mi. NE. of Leith, 11315, 11318. On soil of roadbank, Meaford, 11511 (with *Dicranella varia*).

Phascum cuspidatum Hedw.—Grey Co.: On calcareous soil, stubble field, Claire Williams 356 (with *Pottia truncata*).

Phascum floerkeanum Web. & Mohr—Bruce Co.: On calcareous loam, second-year clover field, 4 mi. NE. of Stokes Bay P.O., Claire Davison & H. Williams, October 12, 1959.

Pottia davalliana (Sm.) C. Jens.—Grey Co.: On bare calcareous till, roadside ditch, NW. of Dundalk, H. Williams 1624. Bruce Co.: On calcareous loam, second-year clover field, 4 mi. NE. of Stokes Bay P.O., Claire Davison & H. Williams, October 12, 1959.

Pottia truncata (Hedw.) Fűrnr. ex BSG—Grey Co.: On banks of river and on soil in meadow, Owen Sound, E. A. Moxley, April 3, 1927, April 6, 1931. On calcareous soil among grasses and in stubble field, Markdale, Claire Williams 356, 1112.—The two latter were correctly named *P. intermedia* (Turn.) Fűrnr. by Mrs. Williams, but I cannot recognize the species at any taxonomic level because of complete intergradation with *P. truncata*.

Desmatodon obtusifolius (Schwaegr.) Schimp.—Grey Co.: On thin clay in crevices of limestone rock at roadside, 3 mi. N. of Eugenia, 11194. Bruce Co.: On shaded limestone, 3 mi. NE. of Mallory Beach, 11359A, 11364.

Tortula mucronifolia Schwaegr.—Grey Co.: On dry soil on ledges of limestone cliffs, Inglis Falls, 11003, 11013A. On thin clay on the base of a roadside sugar maple, 3 mi. N. of Eugenia, 11204. Bruce Co.: On shaded ledge of limestone cliff, 3 mi. NE. of Mallory Beach, 11361.

Tortula ruralis (Hedw.) Gaertn., Meyer & Scherb.—Grey Co.: On dry sand on shingle beach and sunny rock near shore, Cameron Point, 11275, 11297. On sand in sun, churchyard, Leith, 11306. Bruce Co.: On dry, sunny limestone cliff, 3 mi. NE. of Mallory Beach, 11375. On dry, partially shaded limestone in birch-poplar forest, Cameron Lake, 11449.

GRIMMIACEAE

Grimmia affinis Hornsch.—Grey Co.: On thin clay in depressions of limestone, roadside, 3 mi. N. of Eugenia, 11196. On sunny calcareous rock, 2 mi. S. of Chatsworth, 11332.

Grimmia alpicola Hedw.—On limestone, West Hill, Owen Sound, E. A.

Moxley, March 17, 1929 (CAN, as *G. apocarpa* var. *epilosa* fo. *canadensis* Loeske). On rock, S. of Harrison Park, Owen Sound, C. H. Hand & E. A. Moxley 512 (CAN, as *G. apocarpa* var. *epilosa* fo. *canadensis* Loeske). On dry limestone in deep gully, Meaford, 11520. On dry, shaded limestone, Jones Falls, 11066, 11067, 11078. On limestone and thin clay in depressions of limestone, roadside, 3 mi. N. of Eugenia, 11200, 11214. In crevice of limestone, Eugenia Falls, 11219. Bruce Co.: On rock, Black Creek, Stokes Bay, Claire Davison 101.

Grimmia apocarpa Hedw.—Grey Co.: On rock, Owen Sound, J. Macoun, July 29, 1874. Bruce Co.: On limestone, Tobermory, F. J. Hermann 15459.

Grimmia pilifera P.-Beauv.—Grey Co.: On shaded limestone, ravine under West Hill, Owen Sound, E. A. Moxley, May 19, 1929 (TRTC).

EPHEMERACEAE

Ephemerum spinulosum Bruch & Schimp. ex Schimp.—Bruce Co.: On calcareous loam, in old hayfield, 4 mi. NE. of Stokes Bay P.O., Claire Davison & H. Williams, October 12, 1959.

FUNARIACEAE

Funaria hygrometrica Hedw.—Bruce Co.: In shaded crevice of limestone cliff, Sky Lake, 11123. On disturbed soil in clearing, 3 mi. NE. of Mallory Beach, 11380. In crevices of limestone at shore, Tobermory, 11412.

Physcomitrium pyriforme (Hedw.) DeNot.—Grey Co.: On earth, Owen Sound, J. Macoun, August 30, 1901. Bruce Co.: On calcareous loam in old hayfield, 4 mi. NE. of Stokes Bay P.O., Claire Davison & H. Williams, October 12, 1959 (with *Ephemerum spinulosum*).

BRYACEAE

Pohlia nutans (Hedw.) Lindb.—Grey Co.: On very rotten stump, hardwood swamp, Jackson, 11095. On shaded hummock, fen in late stage of succession, Berkeley, 11264. Bruce Co.: Stokes Bay, E. A. Moxley, June 20, 1934 (TRTC, as *P. pulchella*).

Pohlia wahlenbergii (Web. & Mohr) Andr.—Grey Co.: On wet shale and limestone cliffs near waterfall, Fairmount, 11533.

Leptobryum pyriforme (Hedw.) Schimp.—Bruce Co.: On damp humus and charred stumps, cedar swamp, Crane River (N. of Miller Lake), 11455.

Bryum argenteum Hedw.—Grey Co.: On calcareous soil in stubble field, 2 mi. S. of Chatsworth, 11330.

Bryum capillare Hedw.—Grey Co.: On base of hardwood, Jones Falls, 11071. On roadside sugar maples, Massie, 11177 (with *Orthotrichum obtusifolium*). On limestone at roadside, Meaford, 11507. Bruce Co.: On bark of sugar maple, open hardwood stand at roadside, Hepworth, 11071.

Bryum creberrimum (BSG) Tayl.—Grey Co.: On soil on dry ledge of limestone cliff, Inglis Falls, 11013. In crevices of dry, shaded limestone cliff, Jones Falls, 11056. On soil of roadbank, Meaford, 11505. Bruce Co.: On dry ledge of limestone cliff, 3 mi. NE. of Mallory Beach, 11373.

Bryum stenotrichum C. M.—Grey Co.: On limestone in pasture, 3 mi. NE. of Leith, 11327. Bruce Co.: On thin soil over limestone in sunny opening in dry forest, Tobermory, 11389.

Bryum pseudotriquetrum (Hedw.) Gaertn., Meyer & Scherb.—Grey Co.:

On damp limestone near brook, Inglis Falls, 11023. On rotten log, hardwood swamp, Jackson, 11103. On rotten log, cedar swamp, Massie, 11186. On calcareous mud at edge of stream, Eugenia Falls, 11221. On hummock, open fen, Markdale, 11242. On damp sand among rocks on beach, Cameron Point, 11278. Bruce Co.: In damp niches in limestone at shore and on log in dried-up swampy area in dry forest, Tobermory, 11384, 11387, 11408. On wet humus near pool, cedar swamp, Crane River (N. of Miller Lake), 11460. On damp limestone under bridge, Sauble Falls, 11586. On rotten log in bog, Wiarton, E. A. Moxley, June 14, 1930 (TRTC, as *B. duvalii*).

Rhodobryum roseum (Hedw.) Limpr.—Grey Co.: On top of dry, shaded limestone boulder, Jones Falls, 11073. On limestone, hardwood forest, 2 mi. W. of Woodford, 11496. On top of dry limestone boulder, Inglis Falls, 11611.

MNIACEAE

Mnium affine Bland. ex Schwaegr.—Grey Co.: On damp humus, hardwood swamp, Jackson, 11094. Among sedges, fen in late stage of succession, Berkeley, 11261. On soil in dense woods, 5 mi. NE. of Leith, 11322.

Mnium cinclidioides Hüb.—Bruce Co.: In boggy woods, Red Bay, E. A. Moxley, July 1937, 1938 (TRTC).

Mnium cuspidatum Hedw.—Grey Co.: On ledge of dry, shaded limestone cliff, Jones Falls, 11075. On base of red maple, hardwood swamp, Jackson, 11100. On base of white cedar, cedar swamp, Williamsford, 11339 (with *Tortella tortuosa*). Bruce Co.: On rotten log in dense shade, dry birch-poplar forest, Cameron Lake, 11444 (with *M. orthorrhynchum*).

Mnium longirostrum Brid.—Grey Co.: On moist, shaded limestone beside river, Inglis Falls, 11602.

Mnium marginatum (With.) Brid. ex P.-Beauv.—Grey Co.: On deeply shaded limestone, Walters Falls, 11137.

Mnium orthorrhynchum Brid.—Grey Co.: On deeply shaded humus over limestone cliff, 6 mi. E. of Owen Sound, 11133. On deeply shaded humus over limestone, Walters Falls, 11149. On damp, rotten log, cedar swamp, Williamsford, 11335. On limestone, hardwood forest, 2 mi. W. of Woodford, 11487. On root of *Tilia*, Meaford, 11518. Bruce Co.: On shaded limestone, 3 mi. NE. of Mallory Beach, 11367. On dry, shaded log, birch-poplar forest, Cameron Lake, 11444.

Mnium pseudopunctatum Bruch & Schimp.—Bruce Co.: On humus in cedar swamp, Warner Bay, 11440. On wet humus, cedar swamp, Pine Tree Harbour, 11477. On wet soil in partial shade, fen at edge of Sauble Beach, 11595.

Mnium punctatum Hedw.—Grey Co.: On wet limestone in temporary brook, Walters Falls, 11169. Var. *elatum* Schimp.—Grey Co.: On wet, shaded humus, fen in late stage of succession, Berkeley, 11267.

Mnium spinulosum BSG—Grey Co.: On limestone cliff in deep shade, Inglis Falls, 11006. Bruce Co.: On dry, rotten log, Sky Lake, 11128.

Mnium stellare Hedw.—Grey Co.: On very rotten stump, hardwood swamp, 11096 (with *Tortella humilis*). On damp humus at base of tree, cedar swamp, Massie, 11185. On exposed root, near Owen Sound, Derby Twp., E. A. Moxley, July 1, 1935 (with *Plagiothecium sylvaticum*).

AULACOMNIACEAE

Aulacomnium androgynum (Hedw.) Schwaegr.—Grey Co.: On limestone under escarpment, N. side of West Hill, Owen Sound, *E. A. Moxley*, July 1933 (TRTC).

Aulacomnium heterostichum (Hedw.) BSG—Grey Co.: On base of tree, Owen Sound, *J. Macoun*, September 21, 1890.

Aulacomnium palustre (Hedw.) Schwaegr.—Grey Co.: On humus of hummock, open fen, Markdale, 11253. Bruce Co.: On damp humus, birch-poplar forest, Cameron Lake, 11458.

MEESIACEAE

Paludella squarrosa (Hedw.) Brid.—Bruce Co.: In spruce-cedar bog, Lions Head, *W. C. Steere*, June 20, 1938.

Meesia tristicha BSG—Bruce Co.: In bog, Sauble Beach, *H. S. Conard*, June 22, 1938 (IA), *E. A. Moxley*, June 22, 1938 (TRTC).

Meesia uliginosa Hedw.—Bruce Co.: In bogs and wet meadows, Sauble Beach, *E. A. Moxley*, June 26, 1930, *R. F. Cain*, June 22, 1941 (TRTC).

Amblyodon dealbatus (Hedw.) BSG—Bruce Co.: In damp crevices in limestone at shore, Tobermory, 11411. On side of damp rotten log in swamp, Sauble Falls, 11583.

CATOSCOPIACEAE

Catoscopium nigratum (Hedw.) Brid.—Bruce Co.: In damp niches in limestone at shore of Hay Bay, 11403. In damp crevices of limestone at shore, Tobermory, 11410. On wet, shaded sand, fen at edge of Sauble Beach, 11593.

BARTRAMIACEAE

Plagiopus oederiana (Sw.) Limpr.—Grey Co.: On side of limestone boulder, Eugenia Falls, 11561. On shaded limestone cliff, Inglis Falls, 11622. Bruce Co.: On deeply shaded limestone cliff, 3 mi. NE. of Mallory Beach, 11357. On shaded limestone cliff, Dunks Bay, 11421.

Bartramia pomiformis Hedw.—Grey Co.: On shaded limestone cliff, Inglis Falls, 11028.

Philonotis fontana (Hedw.) Brid.—Grey Co.: Among sedges, open fen, Markdale, 11254. Bruce Co.: Among limestone rocks in seepage at shore, Hay Bay, 11395.

TIMMIACEAE

Timmia megapolitana Hedw.—Grey Co.: On shaded face of limestone cliff, Inglis Falls, 11025. Bruce Co.: On soil, damp, shaded ledge of limestone cliff, Sky Lake, 11122. On shaded ledge of limestone cliff, 3 mi. NE. of Mallory Beach, 11372.

ORTHOTRICHACEAE

Orthotrichum anomalum Hedw.—Grey Co.: On rock, East Hill, Owen Sound, *E. A. Moxley*, May 24, 1930 (TRTC). On yellow birch, Inglis Falls, 11021. On dry, shaded limestone boulders, Jones Falls, 11074. On roadside sugar maples, Massie, 11174. On limestone and granite rocks or on clay in depressions in rocks and on bark at base of sugar maple, at roadside, 3 mi. N. of Eugenia, 11193, 11195, 11201, 11215. Bruce Co.: On dry, sunny limestone cliff and boulder, 3 mi. NE. of Mallory Beach, 11374, 11375 (with *Tortula ruralis*).

—This species is typical of limestone rocks and is only rarely found on trees. In at least some of the local collections, the trees were along dusty roads, and the bark was no doubt impregnated with fine calcareous soil.

Orthotrichum obtusifolium Brid.—Grey Co.: On roadside sugar maples, Massie, 11177. On sugar maple, roadside, 3 mi. N. of Eugenia, 11198, 11211 (with *O. pumilum*). On ash, roadside, 3 mi. NE. of Annan, 11309 (with *O. pumilum*). On alder, cedar swamp, Williamsford, 11337 (with *O. sordidum*). Bruce Co.: On sugar maple, open hardwood stand at roadside, Hepworth, 11042A. On sugar maples, Port Elgin, 11083. On sugar maple, roadside, Chesley Lake, 11090. On tree, Sauble Falls, *C. H. Hand* 831 (with *O. stellatum*).

Orthotrichum pumilum Dicks.—Grey Co.: On sugar maples, roadside, 3 mi. N. of Eugenia, 11211. On ash, roadside, 3 mi. NE. of Annan, 11309. Bruce Co.: On sugar maple, Port Elgin, 11083 (with *O. obtusifolium*), 11086.

Orthotrichum sordidum Sull. & Lesq. ex Aust.—Grey Co.: On elm, hardwood swamp, Jackson, 11101. On sugar maple, roadside, Kilsyth, 11114. On sugar maple, 2 mi. E. of Woodford, 11136. On sugar maple at roadside and on *Populus grandidentata* at edge of cedar swamp, Massie, 11176, 11189 (with *O. speciosum* var. *elegans*). On sugar maple, roadside, 3 mi. N. of Eugenia, 11202, 11206, 11213. On sugar maple, roadside, 3 mi. NE. of Annan, 11310. On alder, cedar swamp, Williamsford, 11337. On red maple, hardwood swamp, 4½ mi. NE. of Kimberley, 11540. Bruce Co.: On *Tilia* and sugar maple, open hardwood stand at roadside, Hepworth, 11041, 11042.

Orthotrichum speciosum Nees ex Sturm var. *elegans* (Schwaegr. ex Hook. & Grev.) Warnst.—Grey Co.: On bark of elm, hardwood swamp, Jackson, 11101A. On roadside sugar maples and on *Populus grandidentata* at edge of cedar swamp, Massie, 11176A, 11189. On bark of alder, cedar swamp, Williamsford, 11337 (with *O. sordidum*).

Orthotrichum stellatum Brid.—Grey Co.: On sugar maple, roadside, Massie, 11175. On sugar maple, roadside, Leith, 11301. Bruce Co.: On *Tilia*, open hardwood stand at roadside, Hepworth, 11041A. On tree, Sauble Falls, *C. H. Hand* 831.

Orthotrichum strangulatum P.-Beauv.—Bruce Co.: On limestone cliff beside shore, Dunks Bay, 11416.

Ulota crispa (Hedw.) Brid.—Grey Co.: On red maple, hardwood swamp, 4½ mi. NE. of Kimberley, 11550. On ash and yellow birch, Eugenia Falls, 11555.

Ulota hutchinsiae (Sm.) Hamm.—Grey Co.: On rock, West Hill, Owen Sound, *E. A. Moxley*, October 18, 1926 (TRTC).

FONTINALACEAE

Dichelyma capillaceum (With.) Myr.—Bruce Co.: Attached to roots of tree in swamp, Boat Lake, *E. A. Moxley*, July 10, 1927 (CAN).

Dichelyma pallescens BSG—Grey Co.: On bark at base of red maple in swamp, 4½ mi. NE. of Kimberley, 11551.

Fontinalis antipyretica Hedw.—Grey Co.: In small stream from iron springs, Inglis Falls, *E. A. Moxley*, July 18, 1925 (TRTC).

Fontinalis dalecarlica Schimp. ex BSG—Grey Co.: On submerged limestone, Pottawatomi Creek, above Jones Falls, 11598. Bruce Co.: Sauble Falls, *C. H. Hand* 617.

Fontinalis duriaei Schimp.—Grey Co.: In small stream near Inglis Falls,

E. A. Moxley, July 18, 1925 (TRTC). Bruce Co.: On rocks in stream, Sauble Falls, *H. H. Brown*, July 1, 1939 (TRTC), *C. H. Hand* 618.

Fontinalis hypnoides C. J. Hartm.—Bruce Co.: On roots in a drying swamp, Oliphant Beach, *E. A. Moxley*, July 10, 1927. In mill stream, Oxenden, *C. H. Hand* 586.

CLIMACIACEAE

Climacium dendroides (Hedw.) Web. & Mohr—Grey Co.: On wet humus, hardwood swamp, Jackson, 11110. Bruce Co.: On wet humus, cedar swamp, Pine Tree Harbour, 11471.

HEDWIGIACEAE

Hedwigia ciliata (Hedw.) P.-Beauv.—Grey Co.: On top of dry, shaded limestone boulder, Jones Falls, 11065. On bark of leaning tree over stream, Eugenia Falls, 11226. On granite rock in pasture, 3 mi. NE. of Leith, 11325. On sunny, calcareous rock, 2 mi. S. of Chatsworth, 11333. On granite rock, hardwood forest, 2 mi. W. of Woodford, 11499.

LEUCODONTACEAE

Leucodon sciuiroides (Hedw.) Schwaegr.—Grey Co.: On bark at base of elm, hardwood swamp, Jackson, 11109. On sugar maple, roadside, Kilsyth, 11115. On base of sugar maple, 3 mi. N. of Eugenia, 11203, 11209. Bruce Co.: On bark near base of elm, roadside, Chesley Lake, 11091. On dry, shaded limestone cliff, 3 mi. NE. of Mallory Beach, 11376. On dry, partially shaded limestone boulder, birch-poplar stand, Cameron Lake, 11445.

NECKERACEAE

Neckera pennata Hedw.—Grey Co.: On yellow birch, Inglis Falls, 11030. On trees, Sydenham River, Owen Sound, *J. Macoun*, September 14, 1890.

Homalia trichomanoides (Hedw.) BSG—Grey Co.: On damp, shaded limestone cliff, Inglis Falls, 11036. On bark at base of stump, hardwood swamp, Jackson, 11102.

Thamnobryum alleghaniense (C.M.) Nieuwl.—Grey Co.: On deeply shaded limestone wall of gorge and in crevice of shaded limestone boulder, Inglis Falls, 11017, 11619.

THELIACEAE

Myurella julacea (Schwaegr.) BSG—Grey Co.: On wet, rotten cedar logs and soil over them, cedar swamp, Williamsford, 11342. Bruce Co.: In dry crevice of limestone outcrop, dry forest, Tobermory, 11391. In dry, shaded crevice of limestone at shore, Hay Bay, 11398. In dry recesses of limestone cliff, Dunks Bay, 11419. On ledge and crevices of dry, shaded limestone cliff, Dyer Bay, 11480 (with *Encalypta raptocarpa*), 11482.

Myurella sibirica (C. M.) Reim.—Grey Co.: On shaded limestone cliff, Inglis Falls, 11014. On soil, deeply shaded bank of ravine, Leith, 11302, 11303. On wet, rotten cedar logs and soil over them, cedar swamp, Williamsford, 11341. On base of limestone boulder, Eugenia Falls, 11565. Bruce Co.: In damp, shaded crevice of limestone cliff and on moss humus at the base, Sky Lake, 11125, 11127 (with *Amblystegiella sprucei*). On side of damp, rotten log in swamp, Sauble Falls, 11583 (with *Amblyodon dealbatus*).

LESKEACEAE

Lindbergia brachyptera (Mitt.) Kindb.—Grey Co.: On sugar maple, roadside, Kilsyth, 11116. On sugar maple, roadside, 3 mi. N. of Eugenia, 11198 (with *Orthotrichum obtusifolium*), 11207. Bruce Co.: On sugar maple, hardwood stand at roadside, Hepworth, 11040.

Leskea gracilescens Hedw.—Grey Co.: On base of red maple, hardwood swamp, 4½ mi. NE. of Kimberley, 11548. Bruce Co.: On sugar maple, open hardwood stand at roadside, Hepworth, 11044.

Leskea obscura Hedw.—Bruce Co.: On sugar maple, Port Elgin, 11087.

Leskeella nervosa (Brid.) Loeske—Grey Co.: On dry, shaded, rotten log, Inglis Falls, 11015. On dry, shaded limestone, Jones Falls, 11057. On stone in woods, Owen Sound, *J. Macoun*, September 16, 1890 (with *Platydictya subtile*). On base of sugar maple, roadside, Kilsyth, 11113. On sugar maple, roadside, 3 mi. N. of Eugenia, 11197. On limestone, Meaford, *C. H. Hand* 809 (with *Homomallium adnatum*). Kimberley, *C. H. Hand*, July 20, 1939 (TRTC, as *Haplocladium microphyllum*).

Pseudoleskeella tectorum (Funck ex Brid.) Kindb. ex Broth.—Bruce Co.: On dry, shaded limestone, Dunks Bay, 11417.

Heterocladium dimorphum (Brid.) BSG—Grey Co.: On bases of trees on road to Eugenia, S. of Meaford, *C. H. Hand*, July 6, 1939.

Anomodon attenuatus (Hedw.) Hüb.—Grey Co.: On shaded limestone cliff, Inglis Falls, 11034. Bruce Co.: On shaded limestone, 3 mi. NE. of Mallory Beach, 11360 (with *Encalypta procera*). On dry limestone cliff, birch-poplar forest, Cameron Lake, 11448.

Anomodon rostratus (Hedw.) Schimp.—Grey Co.: On shaded limestone cliff, Inglis Falls, 11027. On rock, East Linton, *H. H. Brown*, July 1, 1942 (TRTC, as *Haplocladium microphyllum*). Bruce Co.: On shaded limestone cliff, 3 mi. NE. of Mallory Beach, 11361 (with *Tortula mucronifolia*), 11378. On dry limestone cliff, birch-poplar forest, Cameron Lake, 11446.

Anomodon rugelii (C. M.) Keissl.—Grey Co.: On beech and also on limestone, Owen Sound, *J. Macoun*, September 16, 1890.

Anomodon viticulosus (Hedw.) Hook. & Tayl.—Grey Co.: On yellow birch and on shaded ledge of limestone cliff, Inglis Falls, 11002, 11008, 11008A. Bruce Co.: On dry limestone cliff, birch-poplar forest, Cameron Lake, 11447.

Thuidium delicatulum (Hedw.) BSG—Grey Co.: On rotten log, hardwood swamp, Jackson, 11097.

Thuidium minutulum (Hedw.) BSG—Grey Co.: On shaded limestone, hardwood forest, 2 mi. W. of Woodford, 11495.

Thuidium philibertii Limpr.—Grey Co.: On wet humus, cedar swamp, Massie, 11188.

Thuidium pygmaeum BSG—Grey Co.: On shaded limestone, hardwood forest, 2 mi. W. of Woodford, 11495A.

Thuidium recognitum (Hedw.) Lindb.—Grey Co.: On dry, shaded limestone, Jones Falls, 11055. Bruce Co.: On dry forest humus, Dunks Bay, 11434.

Thuidium scitum (P.-Beauv.) Aust.—Grey Co.: On beech, Owen Sound, *J. Macoun*, September 16, 1890.

Abietinella abietina (Hedw.) Fl.—Grey Co.: On dry, shaded limestone, Eugenia Falls, 11224. On soil among rocks, dry *Thuja* forest along shore, Cameron Point, 11280. Bruce Co.: On limestone cliff, Dunks Bay, 11436.

Helodium blandowii (Web. & Mohr) Warnst.—Grey Co.: Under spruce, ~~fen~~ in late stage of succession, Berkeley, 11266.

Helodium paludosum (Sull.) Aust.—Grey Co.: On roots of elder, swamp, Rockford, E. A. Moxley, September 8, 1930 (TRTC).

AMBLYSTEGIACEAE

Cratoneuron commutatum (Hedw.) Roth var. *falcatum* (Brid.) Mönk.—Bruce Co.: On wet sand, Sauble Beach, E. A. Moxley, August 14, 1927, R. F. Cain 1563 (TRTC, with *Drepanocladus vernicosus*). Oliphant, E. A. Moxley (TRTC, with *Drepanocladus vernicosus*). At edge of wet, sandy depression near Lake Huron, Amabel Twp., E. A. Moxley, August 18, 1927.

Cratoneuron filicinum (Hedw.) Spruce—Grey Co.: On wet limestone in brook and in splash and seepage zones, Inglis Falls, 11019, 11020, 11032. On wet limestone in temporary brook, Walters Falls, 11154. Among sedges, open fen, Markdale, 11246. At edge of spring, Eugenia Falls, 11572. Bruce Co.: On limestone near shore, Hay Bay, 11397. On limestone, Lions Head, H. H. Brown, July 14, 1945 (TRTC, as *Haplocladium microphyllum*).

Campylium chrysophyllum (Brid.) J. Lange—Grey Co.: On soil among maples, Jones Falls, 11069 (with *Fissidens bushii*). On limestone and rotten log, cedar swamp, Massie, 11184. On shaded soil, hardwood forest, 2 mi. W. of Woodford, 11488.

Campylium hispidulum (Brid.) Mitt.—Grey Co.: On dry soil among white birches, Jones Falls, 11141. On rotten log beside stream, roadside sugar maple stand, Massie, 11146 (with *Hygrohypnum luridum*). On rotten log, ravine, Fairmount, 11529.

Campylium stellatum (Hedw.) C. Jens.—Grey Co.: Among sedges, open fen, Markdale, 11244, 11245 (with *Calliergonella cuspidata*). Bruce Co.: On humus in shelter of limestone boulder at shore, Hay Bay, 11402. On wet humus, cedar swamp, Crane River (N. of Miller Lake), 11454. On wet sand in bog, Oliphant, R. F. Cain 1560 (TRTC, with *Drepanocladus vernicosus*). Sauble Beach, H. S. Conard, June 22, 1938 (TRTC, with *Drepanocladus vernicosus*). In bog, Chesley Lake, E. A. Moxley, July 3, 1942 (TRTC, with *Drepanocladus vernicosus*).

Leptodictyum riparium (Hedw.) Warnst.—Grey Co.: On old timber in stream below falls, Fairmount, 11535. On wet sticks, hardwood swamp, 4½ mi. NE. of Kimberley, 11541, 11552. On limestone submerged in creek, Jones Falls, 11630.—*Fo. longifolium* (Schultz) Grout—Grey Co.: In swamp, Owen Sound, Mrs. Wm. Roy, 1876 (TRTC, with *Calliergon richardsonii*).

Hygroamblystegium fluviatile (Hedw.) Loeske—Grey Co.: On limestone in spray zone, Inglis Falls, 11029.

Hygroamblystegium noterophilum (Sull. & Lesq.) Warnst.—Grey Co.: On damp limestone in creek bed, Indian Falls, 11350, 11352 (with *Hygrohypnum luridum*). On limestone, submerged in creek, Jones Falls, 11631.

Hygroamblystegium orthocladum (P.-Beauv.) Loeske—Grey Co.: On wet limestone beside brook, Jones Falls, 11063. On wet limestone in intermittent brook, Walters Falls, 11166.

Hygroamblystegium tenax (Hedw.) Jenn.—Grey Co.: On wet limestone and rotten log, in and beside stream and spring, Walters Falls, 11150, 11152, 11163, 11164. On damp rock in brook, cedar swamp, Williamsford, 11338. On

rather dry, shaded ledge of limestone cliff near waterfall, Fairmount, 11528. On wet limestone in spring, Inglis Falls, 11620.

Amblystegium juratzkanum Schimp.—Grey Co.: On damp humus, cedar swamp, Massie, 11182.

Amblystegium serpens (Hedw.) BSG—Grey Co.: On base of tree, Owen Sound, J. Macoun, September 16, 1890. On granite rock, dense woods, 5 mi. NE. of Leith, 11316. On soil of roadbank, Meaford, 11512. Bruce Co.: On bark in crotch of sugar maple, Port Elgin, 11085.

Amblystegium varium (Hedw.) Lindb.—Grey Co.: In knothole of roadside sugar maple, Fairmount, 11526.

Drepanocladus aduncus (Hedw.) Warnst.—Grey Co.: On mud, shingle beach, Cameron Point, 11277. Bruce Co.: On sunny humus, dried-up pool in dry forest, Tobermory, 11392. Var. *capillifolius* (Warnst.) Riehm.—Grey Co.: Submerged, swamp on road to Mountain Lake near Meaford, C. H. Hand 69. In swamp, 2 mi. N. of Wiarton, C. H. Hand & E. A. Moxley 122. Var. *polycarpus* (Bland. ex Voit) Roth fo. *gracilescens* (BSG) Mönk.—Bruce Co.: Among limestone rocks in seepage at shore, Hay Bay, 11404.

Drepanocladus revolvens (Sw.) Warnst.—Bruce Co.: In bog, Sauble Beach, E. A. Moxley, June 22, 1928, June 23, 1938 (TRTC).

Drepanocladus uncinatus (Hedw.) Warnst.—Grey Co.: On decayed wood, West Hill, Owen Sound, C. H. Hand & E. A. Moxley 603. On damp log, Eugenia Falls, 11569 (with *Oncophorus wahlenbergii*). Bruce Co.: On humus, dry forest, Tobermory, 11386. In bog, Sauble Beach, E. A. Moxley, June 22, 1928 (TRTC). Red Bay, J. A. Simon, Jr., July 1943 (TRTC, as *Drepanocladus exannulatus* var. *rotae*).

Drepanocladus vernicosus (Lindb. ex C. J. Hartm.) Warnst.—Grey Co.: Among sedges, open fen, Markdale, 11250. Bruce Co.: Among limestone rocks in seepage, Sauble Falls, 11582. In bogs and on wet sand among dunes, Sauble Beach, E. A. Moxley, June 1938, H. S. Conard, June 22, 1938, H. H. Brown, June 22, 1941, June 29, 1942, R. F. Cain 1557, 1558, 1559, 1563 (TRTC). In bogs, Oliphant, E. A. Moxley, June 20, 1934, July 3, 1945, H. S. Conard, June 23, 1938, R. F. Cain 1560, 1561 (TRTC). In swampy meadow, Red Bay, E. A. Moxley, August 4, 1935 (TRTC). On limestone near shore, Hay Bay, 11405. In swamp, Hay Bay, P. Krotkov 667 (TRTC, as *D. exannulatus*). At edge of pool, cedar swamp, Crane River (N. of Miller Lake), 11462. On wet humus among sedges, Pine Tree Harbour, 11473. In bog, Chesley Lake, E. A. Moxley, July 3, 1942 (TRTC). Gould Lake, E. A. Moxley, July 3, 1942 (TRTC). Stokes Bay, E. A. Moxley, June 20, 1934 (TRTC). In bog, Pike Bay, E. A. Moxley, August 17, 1929 (TRTC).

Hygrohypnum luridum (Hedw.) Jenn.—Grey Co.: On damp limestone at edge of brook, Jones Falls, 11064. On rotten log beside stream, Walters Falls, 11146. On wet limestone in stream, E. of Wiarton, 11271. On damp limestone in creek, Indian Falls, 11352. On limestone boulder in river, Inglis Falls, 11609. E. A. Moxley, May 17, 1930 (TRTC, as *H. ochraceum*). Bruce Co.: On wet limestone near shore, Dunks Bay, 11418. On damp, shaded limestone near river, Sauble Falls, 11589, E. A. Moxley, May 24, 1936 (TRTC, as *H. ochraceum*).

Calliergon cordifolium (Hedw.) Kindb.—Grey Co.: In swamp, East Linton, E. A. Moxley, July 7, 1927, May 1929, H. H. Brown, July 1, 1942 (TRTC). Connels Swamp, Sydenham Twp., McColl, June 24, 1925 (TRTC). Bruce Co.:

In bog, Sauble Beach, *E. A. Moxley*, August 5, 1925, June 20, 1934 (TRTC). On ground, Chesley Lake, *H. H. Brown*, July 3, 1942 (TRTC). Red Bay, *E. A. Moxley*, July 1938 (TRTC, with *Mnium cinclidioides*).

Calliergon giganteum (Schimp.) Kindb.—Grey Co.: Among sedges, open fen, Markdale, 11249. Cannons [Connells?] Swamp, *McColl*, June 24, 1925 (TRTC). Bruce Co.: On wet humus, cedar swamp, Crane River (N. of Miller Lake), 11464. On humus, hardwood swamp, Sauble Falls, 11587.

Calliergon richardsonii (Mitt.) Kindb. ex Warnst.—Grey Co.: In swamp, Owen Sound, *Mrs. Wm. Roy*, 1876 (TRTC).

Calliergon trifarium (Web. & Mohr) Kindb.—Bruce Co.: On wet humus among sedges, open fen, Pine Tree Harbour, 11472.

Calliergonella cuspidata (Hedw.) Loeske—Grey Co.: Among sedges, open fen, Markdale, 11244 (with *Campylium stellatum*), 11245, 11249 (with *Calliergon giganteum*).

Pleurozium schreberi (Brid.) Mitt.—Grey Co.: On dry, shaded hummock in fen, Markdale, 11241. On shaded humus, dry *Thuja* forest near shore, Cameron Point, 11296. Bruce Co.: On dry, shaded humus, Dunks Bay, 11430.

Scorpidium scorpioides (Hedw.) Limpr.—Bruce Co.: On wet humus among sedges, open fen, Pine Tree Harbour, 11474. On wet soil, open fen, Sauble Beach, 11594.

Scorpidium turgescens (T. Jens.) Loeske—Bruce Co.: On wet humus among sedges in fen, Pine Tree Harbour, 11475.

BRACHYTHECIACEAE

Tomenthypnum nitens (Hedw.) Loeske—Grey Co.: Among sedges, open fen, Markdale, 11248. Bruce Co.: On bank of dried-up swampy area in dry forest, Tobermory, 11390.

Brachythecium acuminatum (Hedw.) Rau & Herv.—Grey Co.: On rocks, Indian Falls, *C. H. Hand* & *E. A. Moxley* 499.

Brachythecium digastrum C. M. & Kindb. ex Macoun & Kindb.—Grey Co.: On base of red maple, hardwood swamp, 4½ mi. NE. of Kimberley, 11549.

Brachythecium oxycladon (Brid.) Jaeg. & Sauerb.—Grey Co.: On base of trees and on limestone, West Hill, Owen Sound, *E. A. Moxley*, November 17, 1928. Bruce Co.: On shaded limestone, Barrow Bay, *P. Krotkov*, August 9, 1935 (TRTC, as *B. plumosum*).

Brachythecium populeum (Hedw.) BSG—Grey Co.: On rocks, Owen Sound, *J. Macoun*, September 16, 1890. On limestone, 2 mi. W. of Woodford, 11492. On moist stones, near Meaford, *C. H. Hand* 5. On stones, Colpoy Bay, *J. Macoun*, August 1, 1871 [possibly in Bruce County].

Brachythecium reflexum (Starke ex Web. & Mohr) BSG—On thin humus over root, Inglis Falls, 11026. On deeply shaded limestone, Walters Falls, 11155.—Numerous local collections reported in the literature as *B. bestii* Grout seem to me to be poorly developed specimens of *B. reflexum*.

Brachythecium rivulare BSG—Grey Co.: On wet soil near stream, Walters Falls, 11161. On limestone cliff wet from dripping, Fairmount, 11536. On rotten log in spring, Eugenia Falls, 11560. On wet sticks and limestone in river and spring, Inglis Falls, 11604, 11608. On rock under Jones Falls, *H. H. Brown*, July 2, 1942 (TRTC).

Brachythecium rutabulum (Hedw.) BSG—Grey Co.: On shaded limestone,

Inglis Falls, 11024. On deeply shaded limestone, Walters Falls, 11137 (with *Mnium marginatum*). On soil in dense woods, 5 mi. NE. of Leith, 11321. Bruce Co.: On dry, rotten log, dense birch-poplar forest, Cameron Lake, 11442.

Brachythecium salebrosum (Web. & Mohr) BSG—Grey Co.: On old logs and stones, Owen Sound, *J. Macoun*, September 14, 16, 1890. On soil, Owen Sound, *E. A. Moxley*, November 26, 1930 (CAN, as *B. campestre*). On deeply shaded limestone, Walters Falls, 11148. On soil of roadbank, Meaford, 11506.

Brachythecium turgidum (C. J. Hartm.) Kindb.—Grey Co.: On wet or dry limestone, Inglis Falls, *E. A. Moxley*, November 8, 1930, *W. C. Steere*, June 20, 1938, *R. F. Cain* 1050. On rocks, Woodford, *C. H. Hand* 887. Bruce Co.: On limestone ledge, Lions Head, *C. H. Hand* 697. In seepage on dolomite cliff, Little Cove, *H. Williams* 1616.

Brachythecium velutinum (Hedw.) BSG—Grey Co.: On shaded rock, dry *Thuja* forest along shore, Cameron Point, 11285. On dry, shaded soil, bank of ravine, 5 mi. NE. of Leith, 11314. On soil among trees, Owen Sound, *E. A. Moxley*, March 6, 1927, March 26, 1927, March 30, 1929. On stones, Meaford, *C. H. Hand* 2.

Bryhnia graminicolor (Brid.) Grout—Grey Co.: On side of densely shaded, dry limestone boulder, Eugenia Falls, 11573. On shaded limestone cliff, Inglis Falls, 11601. Bruce Co.: On moss humus at base of limestone cliff, Sky Lake, 11127 (with *Platydictya jungermannioides*).

Rhynchostegiella compacta (C. M.) Loeske—Grey Co.: On damp soil on ledges of limestone cliff near Walters Falls, 11165. Bruce Co.: On moss humus at base of limestone cliff, Sky Lake, 11127A. In dry crevice of limestone cliff, 3 mi. NE. of Mallory Beach, 11371. On damp humus under hollow stump near river, Sauble Falls, 11588.

Cirriphyllum piliferum (Hedw.) Grout—Grey Co.: On soil, humus, and decayed wood, West Hill, Owen Sound, *C. H. Hand* 472a, *E. A. Moxley*, Oct. 19, 1929, *W. C. Steere*, June 20, 1938. In marshy woods under trees, Dornock, *C. H. Hand* 98.

Eurhynchium hians (Hedw.) S.-Lac.—Grey Co.: On soil in dense woods, 5 mi. NE. of Leith, 11317. On soil, Harrison Park, Owen Sound, *C. H. Hand* & *E. A. Moxley* 519. Bruce Co.: On moss humus at base of limestone cliff, Sky Lake, 11127 (with *Platydictya jungermannioides*).

Eurhynchium pulchellum (Hedw.) Jenn.—Grey Co.: In swamp N. of Durham, *C. H. Hand* 139. On thin, shaded humus over limestone, Inglis Falls, 11012. On dry soil among white birches, Jones Falls, 11053 (with *Campylium hispidulum*). On rotten log, hardwood swamp, Jackson, 11108. On soil, dense woods, 5 mi. NE. of Leith, 11320 (with *Atrichum undulatum*). On limestone, West Hill, Owen Sound, *C. H. Hand* & *E. A. Moxley* 138. On base of tree, Meaford, *C. H. Hand* 28. Bruce Co.: On soil, damp, shaded ledge of limestone cliff, Sky Lake, 11122 (with *Timmia megapolitana*). On humus, shaded bank, Sauble Falls, 11584.

Eurhynchium riparioides (Hedw.) Rich.—Grey Co.: On wet rocks in Sydenham River near Owen Sound, *E. A. Moxley*, August 22, 1927. Bruce Co.: Sauble River, *E. A. Moxley*, August 1936 (TRTC, as *Hygrohypnum dilatatum*).

ENTODONTACEAE

Orthothecium intricatum (C. J. Hartm.) BSG—Grey Co.: At base of north wall, West Hill, Owen Sound, *E. A. Moxley*, October 19, 1929.

Entodon cladorrhizans (Hedw.) C.M.—Grey Co.: On very rotten log, hardwood forest, 2 mi. W. of Woodford, 11501.

Entodon seductrix (Hedw.) C.M.—Grey Co.: On rotten log, hardwood swamp, 4½ mi. NE. of Kimberley, 11542.

PLAGIOTHECIACEAE

Plagiothecium denticulatum (Hedw.) BSG var. *tenellum* BSG—Grey Co.: On thin, shaded humus over limestone, Inglis Falls, 11001. On damp humus under spruce, fen in late stage of succession, Berkeley, 11262 (with *Geocalyx graveolens*). On soil at base of white pine, shaded ravine, Leith, 11305.

Plagiothecium sylvaticum (Brid.) BSG—Grey Co.: On damp humus, hardwood swamp, Jackson, 11098. On exposed root, near Owen Sound, Derby Twp., E. A. Moxley, July 1, 1935 (IA, as *P. latebricola*), August 3, 1936 (TRTC, as *P. latebricola*). On soil at base of tree, steep bank, Harrison Park, Owen Sound, 11345. Var. *roeseanum* (BSG) Lindb. ex C. Hartm.—Grey Co.: On soil among sugar maples, Jones Falls, 11070. On very rotten, charred stump in shade and on humus overhanging limestone boulder, Eugenia Falls, 11230, 11566. On damp humus under spruce, fen in late stage of succession, Berkeley, 11260. On soil of steep bank in woods, 5 mi. NE. of Leith, 11319.

Plagiothecium turfaceum Lindb.—Grey Co.: On rotten log, Walters Falls, 11143. On shaded, rotten log, dry *Thuja* forest along shore, Cameron Point, 11294. On top of very rotten stump, Eugenia Falls, 11563.

SEMATOPHYLLACEAE

Heterophyllum haldanianum (Grev.) Kindb.—Grey Co.: On shaded, rotten logs, Walters Falls, 11147, 11160 (with *Plagiothecium turfaceum*). Bruce Co.: On dry, rotten log in dense birch-poplar forest, Cameron Lake, 11443.

Brotherella recurvans (Mx.) Fl.—Bruce Co.: On base of white birch, Sauble Falls, 11581.

HYPNACEAE

Platydictya confervoides (Brid.) Crum—Grey Co.: On dry, shaded limestone beside river, Inglis Falls, 11615, 11618.

Platydictya jungermannioides (Brid.) Crum—Grey Co.: On dry, shaded limestone, Jones Falls, 11062 (with *Fissidens bryoides*). On deeply shaded limestone, Walters Falls, 11138, 11144. On deeply shaded limestone, Indian Falls, 11351, 11353 (both with *Seligeria campylopoda*). Bruce Co.: On soil on ledge of limestone cliff, Sky Lake, 11124. On moss humus at base of limestone cliff, Sky Lake, 11127.

Platydictya subtile (Hedw.) Crum—Grey Co.: On stone in woods, Owen Sound, J. Macoun, September 16, 1890. On exposed root of sugar maple, Eugenia Falls, 11218. On base of dead tree, hardwood forest, 2 mi. W. of Woodford, 11489.

Platygyrium repens (Brid.) BSG—Grey Co.: On sugar maple, roadside, 3 mi. NE. of Annan, 11310 (with *Orthotrichum sordidum*). Bruce Co.: On base of *Tilia*, open hardwood stand at roadside, Hepworth, 11045. On white cedar, Pine Tree Harbour, 11470.

Pylaisiella polyantha (Hedw.) Grout—Grey Co.: On tree, Jones Falls, J. Macoun, July 26, 1871.

Pylaisiella selwynii (Kindb.) Crum, Steere & Anders.—Grey Co.: In crotch

of sugar maple, roadside, 3 mi. N. of Eugenia, 11212. On red maple, hardwood swamp, 4½ mi. NE. of Kimberley, 11544. Bruce Co.: On sugar maple, Port Elgin, 11084. On shaded limestone, 3 mi. NE. of Mallory Beach, 11365.

Homomallium adnatum (Hedw.) Broth.—Grey Co.: On limestone, Meaford, C. H. Hand 809.

Hypnum cupressiforme Hedw.—Bruce Co.: On ledge of dry, shaded limestone cliff, Dyer Bay, 11481.

Hypnum imponens Hedw.—Grey Co.: On dry logs and in trickle of spring, Eugenia Falls, 11564, 11570, 11571.

Hypnum lindbergii Mitt.—Grey Co.: On moist humus and rotten wood, hardwood swamp, Jackson, 11099, 11104, 11105, 11110 (with *Climacium dendroides*). On wet limestone and rotten log, Walters Falls, 11158, 11170. On wet log and wood humus, cedar swamp, Massie, 11183. Among sedges, open fen, Markdale, 11255. On wet log and sticks in hardwood swamp, 4½ mi. NE. of Kimberley, 11543, 11546, 11553. Bruce Co.: On damp humus near pool, cedar swamp, Crane River (N. of Miller Lake), 11465. Sauble Falls, E. A. Moxley, May 25, 1936 (TRTC, as *Hygrohypnum ochraceum*).

Hypnum pallescens Hedw.—Grey Co.: On dry, shaded log, Inglis Falls, 11004. On very rotten wood and on dry, shaded limestone, Jones Falls, 11080, 11168.

Taxiphyllum deplanatum (Schimp. ex Sull.) Fl.—Grey Co.: On deeply shaded limestone in wooded ravine, Walters Falls, 11167. On limestone, hardwood forest, 2 mi. W. of Woodford, 11493.

Ptilium crista-castrensis (Hedw.) DeNot.—Grey Co.: On shaded granite rock, dry *Thuja* forest along shore, Cameron Point, 11289.

RHYTIDIACEAE

Rhytidiadelphus triquetrus (Hedw.) Warnst.—Grey Co.: On soil in dry, open forest, Eugenia Falls, 11223. On humus, dry *Thuja* forest along shore, Cameron Point, 11283. Bruce Co.: On humus over limestone, Dunks Bay, 11437.

HYLOCOMIACEAE

Hylocomium brevirostre (Hedw.) BSG—Grey Co.: In deeply shaded ravine, Owen Sound, J. Macoun, July 28, 1871.

Hylocomium pyrenaicum (Spruce) Lindb.—Grey Co.: On old logs, Owen Sound, J. Macoun, July 29, 1871, September 16, 1890, E. A. Moxley, November 17, 1928.

Hylocomium splendens (Hedw.) BSG—Grey Co.: On shaded humus, dry *Thuja* forest along shore, Cameron Point, 11295. Bruce Co.: On thin, shaded humus over limestone, Dunks Bay, 11425.

Hylocomium umbratum (Hedw.) BSG—Grey Co.: Under West Hill, Owen Sound, E. A. Moxley, June 8, 1929, June 9, 1929 (TRTC).

DIPHYSICIACEAE

Diphyscium foliosum (Hedw.) Mohr—Grey Co.: On bank near stream, Harrison Park, Owen Sound, E. A. Moxley, May 24, 1929 (TRTC).

TETRAPHIDACEAE

Tetraphis pellucida Hedw.—Grey Co.: On very rotten wood, Inglis Falls, 11022. Bruce Co.: On dry, rotten logs and stumps in dense shade, birch-poplar forest, Cameron Lake, 11450.

POLYTRICHACEAE

Atrichum angustatum (Brid.) BSG.—Grey Co.: On soil hummock, hardwood forest, 2 mi. W. of Woodford, 11500. On soil among maples, Jones Falls, 11052.

Atrichum crispum (James) Sull. & Lesq.—Grey Co.: Owen Sound, E. A. Moxley, July 1926 (TRTC).

Atrichum undulatum (Hedw.) P.-Beauv.—Grey Co.: On soil in dense woods, 5 mi. NE. of Leith, 11320.

Polytrichum commune Hedw.—Bruce Co.: On dry, shaded bank in poplar forest, Sauble Falls, 11580.

Polytrichum formosum Hedw. var. *aurantiacum* (Hoppe ex Funck) C. J. Hartm.—Grey Co.: On soil, hardwood forest, 2 mi. W. of Woodford, 11486.

Polytrichum juniperinum Hedw.—Grey Co.: On dry, shaded hummock, open fen, Markdale, 11237. On rotten wood, opening in dry *Thuja* forest along shore, Cameron Point, 11288. Var. *gracilius* Wahl.—Grey Co.: On old *Sphagnum* hummock, open fen, Markdale, 11256.

Polytrichum piliferum Hedw.—Grey Co.: West Hill, Owen Sound, E. A. Moxley, May 20, 1927 (TRTC).

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A TAXONOMIC ACCOUNT OF THE GENUS *THELIA*

BY HOWARD CRUM

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RÉSUMÉ

La *Thelia*, genre de mousse endémique de l'Amérique du Nord, a trois espèces qui ont beaucoup de ressemblance et de relation avec la *Thuidium* et l'*Anomodon*, et elle est, par conséquent, considérée comme membre de la famille des Thuidiaceae plutôt que celle, mal fondée, des Theliaceae. Le genre et ses espèces sont de nouveau décrits par le détail, et une légende sert à indiquer les différences particulières, notamment dans le cas de la *T. lescurii* qui a été confondue, sans raison, avec la *T. asprella*. On n'a pas fait remarquer précédemment que les trois espèces sont toutes dioïques, les plantes males étant minuscules et epiphytes sur les plantes femelles qui sont plus grandes.

Thelia is a small and highly distinctive genus of three attractive species limited in their distribution to the temperate latitudes of eastern North America. Easily recognized by aspect alone, the genus greatly resembles *Thuidium* in general appearance and gametophytic structure and *Anomodon* in sporophytic characters, including the intimate features of the peristome. Brotherus, in *Die natürlichen Pflanzenfamilien*, placed *Thelia*, together with *Pterigynandrum* and *Myurella*, in the Theliaceae, but I would include it (and probably *Pterigynandrum* and *Myurella* as well) in the Thuidiaceae. The Theliaceae, Leskeaceae, and Thuidiaceae, as conceived by Brotherus, are obviously unnatural families, consisting of heterogeneous elements of diverse phyletic origin. Because of the convenience of familiarity and because a better disposition is not presently available, I am content to recognize the Leskeaceae and the Thuidiaceae, but not the Theliaceae.

Thelia hirtella (Hedw.) Sull. is easily distinguished by simple papillae on its leaf cells and presents no problems in identification. In gametophytic characters it is particularly like a *Thuidium*, because of its rather clearly differentiated stem leaves, fairly abundant, polymorphous, lacinate paraphyllia, and stout, curved papillae. *Thelia lescurii* Sull. and *T. asprella* Sull., with elaborately branched papillae, have been greatly confused, and various authors have considered *T. lescurii* a mere ecological variant of *T. asprella*, but I hold the species in some esteem for both morphological and ecological reasons, at the same time admitting that the specific differences provided by Nature in this case are not so sharp or so easily observed as one might like. Both *T. lescurii* and *T. asprella* have stem and branch leaves essentially similar, and the paraphyllia, similar to those of *T. hirtella*, are few and easily overlooked. These species are less obviously related to *Thuidium*, but there is no question of their close relationship to the *Thuidium*-like *T. hirtella*. All three species are suggestive of the many members of *Thuidium* having ciliate perichaetial leaves.

In all the books and manuals the various species of *Thelia* are described as dioicous. They are actually phyllodioicous. The male plants are minute and consist of a single perigonal bud at the base of a very short leafy shoot. Such dwarf plants are found sparingly on the leaves or tomentum of female plants. I have found them (with difficulty) only on fruiting plants.

The following account of the taxonomy of the genus is based on some fifteen years of intermittent study during which time I have examined all the material

in most North American herbaria of any size or significance, and I feel that the habitats and distributions given in summary below are therefore reasonably complete and accurate.

Thelia Sull. in Gray, Man. Bot. No. U.S. (ed. 2). 660. 1856.

Plants of medium size, in dense, rigid, dull, green, yellow-green, yellow-brown, greyish, or bluish mats. Stems elongate and creeping or sometimes more crowded and ascending, usually radiculose, sometimes densely so, irregularly branched or more frequently regularly 1-pinnate; branches ascending, short and blunt, slender and terete or stout and julaceous; paraphyllia very few to fairly abundant (at least on the stems), polymorphous, laciniate or ciliate at the margins. Stem and branch leaves similar or somewhat differentiated. Branch leaves imbricate wet or dry, very concave, deltoid-ovate, abruptly short- to long-apiculate, $\pm$ decurrent; margins erect, dentate or irregularly spinose-dentate above and $\pm$ ciliate below; costa single, slender, ending at or above the leaf middle, or very rarely and atypically short and double; cells firm-walled, rhombic and coarsely unipapillose on the lumina at back nearly to the insertion (the papillae simple or elaborately forked), somewhat elongate near the costa at base, subquadrate at the basal angles. Phyllodioicous; dwarf male plants resting on leaves or tomentum of female plants; perichaetial leaves pale-yellow, enlarged, erect and sheathing, gradually subulate from an oblong base (with long, flexuose cilia bearing spreading to recurved teeth at the margins), with costa weak or obsolete and cells elongate, those at the apex $\pm$ papillose. Setae rather short to elongate, yellow to red-yellow, smooth, flexuose; capsules erect and symmetric, cylindric to ovoid-cylindric, yellow or brown, smooth or somewhat wrinkled-striate when dry and empty; annulus none or poorly developed and persistent or sometimes fragmenting; operculum long, conic-subulate, slightly oblique; stomata superficial, with 2 guard cells, at extreme base of urn; peristome teeth 16, inserted at or somewhat below the mouth on a very low membrane, white or whitish-yellow, long, narrowly lanceolate, smooth near the base, densely papillose above, not bordered or trabeculate; endostome free, pale and papillose, consisting of a rather low basal membrane, short, irregular, and unequal or rudimentary segments, and no cilia. Spores spherical, smooth or nearly so to finely roughened. Calyptra cucullate, smooth, naked.

Stem leaves larger and more ciliate than branch leaves; paraphyllia fairly abundant, especially on the stems; leaf cells with simple papillae 1. *T. hirtella*

Stem leaves scarcely differentiated; paraphyllia very few; leaf cells with elaborately branched papillae.

Stems creeping, radiculose, 1-pinnately branched; branches slender and terete or only rarely stouter and julaceous, simple; leaves usually not particularly crowded, ciliate-papillose above, long-ciliate below, acute or obtuse, long-apiculate or piliform-apiculate 2. *T. asprella*

Stems crowded and ascending, not or only slightly radiculose; irregularly branched; branches stout and julaceous, often branched; leaves crowded, not or somewhat ciliate-papillose at the margins, not long-ciliate below, obtuse, short-apiculate 3. *T. lescurii*.

1. *Thelia hirtella* (Hedw.) Sull. in Gray, Man. Bot. No. U.S. (ed. 2). 660. 1856.

Pterigynandrum hirtellum Hedw., Sp. Musc. 83. 1801.

Maschalocarpus hirtellus (Hedw.) Spreng., Anleit, Kenntn. Gew. Briefen 3: 218. 1804.

Pterogonium hirtellum (Hedw.) Schwaegr., Suppl. Sp. Musc. 1(1): 108. 1811.

Leskea hirtella (Hedw.) BSG, Bryol. Eur. 5 (fasc. 44/45). 1850.

Hypnum hirtellum (Hedw.) C. M., Syn. Musc. Frond. 2: 468. 1851.

Thelia robusta Duby, Flora 58: 284. 1875.

T. compacta Kindb., Ottawa Nat. 4: 62. 1890.

Plants dull, green, yellow-brown, or greyish-yellow. Stems creeping, densely radiculose, closely 1-pinnate; branches short, erect-ascending, slender and terete or sometimes stouter and julaceous; paraphyllia fairly numerous (especially on stems). Stem leaves about 1–1.3 mm long, strongly ciliate at the margins. Branch leaves about 1 mm long, concave, usually not particularly crowded, imbricate wet or dry, deltoid-ovate and rather abruptly narrowed to a short to fairly long apiculus or piliform acumen which is usually flexuose or spreading when dry, somewhat decurrent; margins erect, irregularly dentate all around and usually $\pm$ spinose-ciliate, especially toward the base; costa single (or occasionally double and short), slender, extending $\frac{1}{2}$ to $\frac{3}{4}$ the leaf length; upper cells rhombic, about 8 μ wide, about 1.5:1, unipapillose over the lumina at back, the papillae simple (or rarely an exceptional one bluntly bifid), high, curved; basal cells shortly oblong near the costa at the insertion, $\pm$ quadrate at the basal angles. Phyllodioicous; dwarf male plants on leaves or tomentum of female plants; perichaetial leaves pale-yellow, erect and sheathing, flexuose-ciliate at the margins (the cilia with spreading or recurved teeth), with costa weak or obsolete and cells pale and elongate, the upper $\pm$ papillose. Setae 5–12 mm long, yellow or red-yellow, smooth, flexuose; capsules erect and symmetric, cylindric or ovoid-cylindric, yellow or brown, smooth, 1.5–2.5 mm long; annulus none or occasionally slightly differentiated in about 2 rows and fragmenting; operculum long, conic-subulate, slightly oblique; stomata superficial, at extreme base of urn; peristome white or yellowish-white, the teeth fairly long, inserted at the mouth on a very low membrane, narrowly lanceolate, smooth at the extreme base, densely papillose above, not bordered or trabeculate; endostome free, papillose, consisting of a rather low basal membrane with segments short and rudimentary or none, cilia lacking. Spores 12–18 μ , spherical, nearly smooth to finely roughened. Calyptra cucullate, smooth, naked.

NOTE: A peristome was once seen with irregular, papillose, preperistome thickenings.

TYPE: Circa Lancaster Pennsylvaniae in arboribus rupibusque [presumably collected by Muehlenberg].

HABITAT: Usually on bark of hardwoods (or occasionally junipers), especially on the bases of trees or on their exposed roots, sometimes on decayed logs or stumps, rarely on soil or rocks, in rather dry, open woods.

RANGE: Wisconsin and southern Ontario to Nova Scotia, south to Florida and Texas; northeastern Mexico. (Specimens have been seen from the following states or provinces: United States—Ala., Ark., Conn., Dela., Fla., Ga., Ind., Ill., Ky., La., Mass., Me., Md., Mich., Miss., N.C., N.J., N.Y., Ohio, Okla., Penn., R.I., S.C., Tenn., Tex., Va., W. Va., Wis. Canada—N.B., N.S., Ont., Que. Mexico—N.L., Tamps.)

EXSICCATI: Austin, Musci Appal. 262. Drummond, Musci Amer. (Rocky Mts.) 79 (as *Pterogonium*). Grout, Hand-Lens Mosses 62, No. Amer. Musci Perf. 339, No. Amer. Musci Pleur. 22, 155. Macoun, Can. Musci 248, 433 in

part (as *T. compacta*). Renauld & Cardot, Musci Amer. Sept. 83. Sullivant, Musci Allegh. 85 (as *Pterigynandrum*). Sullivant & Lesquereux, Musci Bor.-Amer. (ed. 1) 247, (ed. 2) 370.

2. *Thelia asprella* Sull. in Gray, Man. Bot. No. U.S. (ed. 2). 660. 1856.

Leskea asprella BSG, Bryol. Eur. 5 (fasc. 44/45). 1850, *nom. nud.*

Hypnum hirtellum (Hedw.) C. M. var. *furcatum* C. M., Syn. Musc. Frond. 2: 469. 1851.

Plants dull, $\pm$ glaucous, in dark-green or bluish to yellowish or greyish nearly always flat mats. Stems creeping, radiculose to tomentose, closely 1-pinnate; branches erect-ascending, short, terete or occasionally stouter and julaceous; paraphyllia few, on stems, polymorphous. Stem leaves similar to branch leaves and only slightly longer. Branch leaves 0.8–1 mm long, usually not particularly crowded, deltoid-ovate, somewhat decurrent, broadly acute to obtuse, abruptly contracted to a long, clear, often spreading apiculus or piliform acumen (or rarely only short-apiculate); margins ciliate below, ciliate-papillose above; costa single, slender, $\frac{1}{2}$ – $\frac{3}{4}$ the leaf length; cells rhombic nearly to the base, 8 μ wide and about 1.5:1 above, unipapillose at back over the lumina (the papillae much branched, with 3–6 points), oblong near the costa at the insertion and subquadrate at the basal angles. Phyllodioicous: dwarf male plants on tomentum or leaves of female plants; perichaetial leaves pale-yellow, erect and sheathing, long-ciliate (the cilia with spreading or recurved, spinose teeth), with costa weak or obsolete and cells pale and elongate, the upper mostly with long, simple, or somewhat forked papillae. Setae 8–12 mm long, yellow or red-yellow, smooth, flexuose; capsules erect and symmetric, cylindric or ovoid-cylindric, yellow or brown, smooth or occasionally $\pm$ wrinkled-plicate when dry, 2–2.5 mm long; annulus poorly developed, indistinct or sometimes consisting of 2–3 rows of small cells and fragmenting; operculum long, conic-subulate, slightly oblique, 1–1.3 mm long; stomata superficial, at extreme base of urn; peristome teeth white, especially long, narrowly lanceolate, inserted at the mouth on a low membrane, smooth at the extreme base, densely papillose above, not bordered or trabeculate; endostome free, papillose, consisting of a rather low basal membrane and short, irregular and unequal segments; cilia none. Spores 8–13 μ , spherical, smooth or nearly so. Calyptra cucullate, smooth, naked.

NOTE: In the *Index Muscorum*, van der Wijk and Margadant apparently confused *Hypnum asprellum* Schwaegr., Suppl. Sp. Musc. 1(2): 246. 1816, with this species. From the information given in the original description, Schwaegrichen's species could not possibly be a *Thelia*. Rather it would appear to be a *Brachythecium*, possibly a synonym of *B. plumosum* (Hedw.) BSG.

TYPE: Sullivant & Lesquereux, Musci Bor.-Am. (ed. 1) 248 (lectotype; locality and collector not given).

HABITAT: Usually on bark of trees, especially on their bases or exposed roots, sometimes on decayed logs or stumps or on rock or soil, in rather dry, open woods.

RANGE: Minnesota to southern Quebec, south to Florida and Texas. (Specimens were seen from the following states and provinces: United States—Ark., Conn., Fla., Ga., Ill., Ind., Iowa, Kans., Ky., Maine, Mass., Md., Mich., Minn., Mo., N.C., Nebr., N.H., N.J., N.Y., Ohio, Okla., Penn., S.C., Tenn., Tex., Va., Vt., W. Va., Washington, D.C., Wis. Canada—Ont., Que.)

EXSICCATI: Austin, Musci Appal. 263. Grout, Hand-Lens Mosses 61, No. Amer. Musci Pleur. 33 (mixed with *T. lescurii* in some sets), No. Amer. Musci Perf. 142. Macoun, Can. Musci 433 in part (as *T. compacta*), 599. Renauld & Cardot, Musci Amer. Sept. 84b, c. Sullivant & Lesqueureux, Musci Bor.-Amer. (ed. 1) 248, (ed. 2) 371.

3. *Thelia lescurii* Sull. in Gray, Man. Bot. No. U.S. (ed. 2). 660. 1856.

Thelia asprella Sull. var. *lescurii* (Sull.) Habeeb, Rhodora 52: 72. 1950.

Plants very glaucous, bluish- or greyish-yellow to greyish-brown. Stems prostrate or more typically crowded and ascending, not or slightly radiculose, freely and irregularly branched ($\pm$ fasciculate, with branches often $\pm$ branched); branches stout and julaceous, short and blunt, paraphyllia very few (on stems). Stem and branch leaves similar. Branch leaves crowded, imbricate wet or dry, about 1 mm long, very concave, broadly deltoid-ovate, obtuse and abruptly short-apiculate, somewhat decurrent, not or somewhat ciliate-papillose at the margins, not long-ciliate below; costa single, slender, $\frac{1}{2}$ or more often $\frac{3}{4}$ the leaf length; cells about 8 μ wide and 1.5:1 above, rhombic nearly to the base, unipapillose at back on the lumen (the papillae much branched, with 3-6 points), oblong near the costa at the insertion, subquadrate at the basal angles. Phyllo-dioicous; dwarf male plants on leaves of female plants; perichaetial leaves pale-yellow, erect and sheathing, flexuose-ciliate (the cilia with spreading or recurved, spinose teeth), with costa weak or obsolete and cells pale and elongate, the upper $\pm$ papillose (the papillae both simple and forked). Setae 8-15, rarely 23 mm long, yellow or red-yellow, smooth, flexuose; capsules erect and symmetric, cylindric, $\pm$ wrinkled or irregularly ribbed when dry, (1) 1.6-2.8 mm long; annulus none or occasionally poorly developed and persistent; operculum conic-subulate, 0.6-1.1 mm long, slightly oblique; stomata superficial, at extreme base of urn; peristome white, the teeth narrowly long-lanceolate, inserted near or somewhat below the mouth on a low membrane, smooth at the extreme base, densely papillose above, not bordered or trabeculate; endostome free, papillose, consisting of a low basal membrane and irregular, unequal segments, sometimes short or rudimentary, sometimes about $\frac{1}{3}$ as long as the teeth, cilia none. Spores 10-15 μ , spherical, smooth or nearly so to very finely papillose. Calyptra cucullate, smooth, naked.

TYPE: Sullivant & Lesquereux, Musci Bor.-Amer. (ed. 1) 249 (ad terram in sabulosis siccioribus collinis utriusque Carolinae et Georgiae).

HABITAT: On soil or sometimes rocks, only rarely on bark at base of trees or on exposed roots, in dry, open places, such as cedar, pine, or oak barrens, oak-hickory woods or sandhills.

RANGE: New York to Wisconsin and Nebraska, south to Florida and Texas. (Specimens have been seen from Ark., Fla., Ga., Ill., Ind., Ky., La., Miss., Mo., N.C., Nebr., N.J., N.Y., Ohio, Okla., Penn., S.C., Tenn., Tex., Va., Wis.)

EXSICCATI: Austin, Musci Appal. 264 in part (mixed with *T. asprella*). Grout, Hand-Lens Mosses 63, No. Amer. Musci Pl. 14. Renauld & Cardot, Musci Amer. Sept. 191. Small, Mosses So. U.S. 28. Sullivant & Lesquereux, Musci Bor.-Amer. (ed. 1) 249, (ed. 2) 372.

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